V I R G I N I A

FINAL REPORT

WHITE PINE BLISTER RUST CONTROL

UNAKA NATIONAL FOREST

1933 and 1934

by

W. H. Robens,
Blister Rust Checker.

FOREWORD

The protection of white pine from the blister rust by the eradication of Ribes has been carried out in the northern states for several years since its introduction from Europe and to a considerable extent in the western white pine region to which infections have more recently spread. Few protective measures, however had been instituted in the Southern states containing valuable white pine stands until the rapid advance of this disease into Northern Virginia in 1933 threatened the Southern white pine. With the availibility of funds and labor under the Emergency Conservation Work Act, the United States Division of Plant Disease Eradication and Control took advantage of this opportunity to commence activities in the National Forests of the Southern Appalachian Region.

UNAKA NATIONAL FOREST

On the Unaka National Forest active protective measures started on July 13, 1933, with the arrival of Mr. Roy G. Pierce, Associate Pathologist of the Division who outlined the method of survey for pine and the eradication of Ribes to the Forest Officers from July 13 to July 17 inclusive.

Mr. Pierce made a reconnaissance with Mr. K. D. Henze on two planting sites in Tennessee and with Mr. Sipe on July 15.

At this time the Forest Service designated Ward H. Robens as Blister Rust Checker to carry on the survey and control work using labor from the Civilian Conservation Corps on the Forest.

Prior to this Supervisor Graham had issued a Memorandum dated June 19 to all Project Superintendents stating that Gooseberries bushes had been found near an area containing a large per cent of White Pine indicating the possibility of an infection of Blister Rust. All road and cultural foremen were directed to have their crews watch for, pull and hang up all bushes of Gooseberry found on Government land. Wild bushes on private land were to be noted as to the number and location and the cultural crews instructed as to the identification of the genus Ribes. A brief, monthly report covering the number and location of the bushes was to be submitted by the Project Superintendent.

PROGRESS OF THE WORK IN 1933

Since White Pine was abundant in the Northern part of the Unaka, the work was organized first at Camp F-5-Va., Speedwell, Va., under the direction of the Blister Rust Checker.

On July 19, the Supervisor issued the following "Preliminary Plan" to all Project Superintendents as a guide to the future work:

Bristol, Tenn.
July 19, 1934.

White Pine Blister Rust Control

Unaka National Forest

Preliminary Plan

Introduction

White Pine Blister Rust has been found on Ribes (Currants and Gooseberries) about 200 miles north of the Unaka, near Luray, Va. However, it may be nearer or actually on the Forest. It is, therefore, necessary to determine the Ribes and White Pine conditions as soon as possible on the entire Forest. As a general policy, of all ages from five per cent or more of the stems per acre.

General Plans

Mr. Roy G. Pierce, of the Bureau of Plant Industry, will assist in organizing this work. For E.C.W. the line of responsibility will be as follows: Forest Supervisor ---- Staff Assistant in charge of T.S.I. work. Proj. Supt. -- Blister Rust Checker -- Scouter -- Eradication Crew. Ward H. Robens has been assigned as Blister Rust Checker at $167.00 per month. After Mr. Pierce has outlined the work to the Checker, the latter will then train one or more scouters and eradication crews at F-5-Va. It is necessary that all men selected and trained for this work be good dependable workers, the scouters and crew leaders being especially so. The use of $36.00 and $45.00 men should be considered; it is generally desirable to have the same wage class of men doing this work in each camp.

Since Ribes and White Pine have been found together at F-5-Va., this area will be organized first. The Checker will later move to other camps and train scouts, and, if necessary, eradication crews. All men in the scout and crew class will be enrolled men, with the possibility of using local men being considered.

Reference is made to my Memo. to Proj. Supt. dated June 19, filed

S-Disease Control. Effective at once the following policy will be adhered to: Road, Cultural, or other foreman will watch for Ribes, and report number, location, and size to the Proj. Supt. If the bushes found are few enough so that the foreman's regular work will not suffer, they should pull and hang up also. Enrolled men in cultural crews will not make any effort to locate Ribes, since it is felt their primary effort should be concentrated to tree crowns, rather than the ground. The use of a special Ribes man in cultural crews will be discontinued at once, unless it conforms to instructions of recent date as to a straw boss doing this along with other miscellaneous work.

The occurrence of White Pine should also be reported to the Proj. Supt.

A report covering technique, tools, transportation, records, map and other phases will be prepared as soon as possible by the Checker. For existing information, refer to Mr. Pierce's instructions, copy of which has been furnished Robens and Sipe.

Keys and descriptions of the various species of Ribes have been requested and will be forwarded to each camp later.

C. L. Graham.
Forest Supervisor.

On July 18, two enrolled men in the $45 per month class were chosen at Camp F-5-Va. to commence the scouting for Ribes. Locations containing five per cent of white pine were carefully gridironed by running strips across the areas at distances of 25 to 50 feet apart in the coves and bottomlands where Ribes were found to be prevalent and at distances up to 200 feet apart on ridges. The two scouts were used in

company at all times as a safety measure in the woods, keeping approximately abreast of each other on separate lines.

Definite "Instructions for Scouts" were prepared and given the scouts by the Checker as soon as possible to guide them in the procedure of the scouting, since reconnaissance surveys for suitable pine areas on the Forest prevented the Checker from accompanying after the necessary training period. Frequent checks were made on the thoroughness of the eradication.

As the season advanced it became evident that the dry slope and ridge type of cover common to this forest did not produce Ribes bushes of any species. After having the scouts run many miles of scouting lines across these dry slopes, carefully gridironing the areas in the customary manner, but without obtaining results, a different procedure in scouting was initiated.

Basing the course upon what had been found in the way of location of Ribes, five distinct site-areas were determined which scouts were trained to recognize and cover in detail. These are as follows:

I. - Bottomlands.
II. - Coves.
III. - Rockslides & Ledges.
IV. - Ridge Tops.
V. - Stands of pure or Nearly Pure White Pine.

Bottomlands either wooded or open were covered by scouting lines at 25 to 50 feet intervals. Two scouts were used in company at all times working a line approximately abreast of each other and following a serpentine or quartering course so that a strip 25-50 feet wide was covered rather than a single narrow line.

All coves, including the smallest dry stream course was followed,

the narrow ones worked by having each scout cover the area between the stream bank and the sides of the cove.

In the case of the third site enumerated, scouts examined the area by lines across the ledges or up and down the rockslides. Slides producing Ribes frequently were found to occur near the heads of coves so that they were covered in conjunction with the cove work.

Very few ridge tops were found to yield Ribes. However, an occasional one was sufficiently flat-topped to have the soil and bottomland type of plant growth preferred by Ribes. This made it essential that these sites be checked in the scouting.

Where stands of pure or nearly pure white pine occurred on the Unaka, site factors were usually such that Ribes were likewise present. These spots were covered by scouting lines at short intervals.

That no sites different from the five given above, but containing Ribes were not missed, a careful check was made at each camp visited. This was carried out during reconnaissance trips to determine locations of areas with a sufficient stocking of pine to necessitate scouting. In event any such areas were found, the scouts were directed to cover these places in addition to the others.

SCOUTING AND ERADICATION RESULTS

In Virginia, work was carried on by two scouts from each of the three C.C.C. camps at Speedwell, Sugar Grove, and Damascus. In addition a foreman and eradication crew was employed at the Damascus camp from May 8 to May 26, 1934. In Tennessee, the work was carried on from Damascus, Virginia camp and the Tennessee camps at Jacobs Creek, Hampton and Unicoi.

The following table shows the activities at the Virginia camps and the Jacobs Creek, Tennessee camp in which blister rust control work was under the supervision of Mr. Robens. A supplementary report covering the work from the Hampton and Unicoi camps is to be prepared by Mr. Swarthout as soon as activities are completed at those stations.

Scouting at all camps where the work was carried on by Mr. Robens was performed under the system described above. The large numbers of gooseberry bushes found in one area near the Damascus camp justified the use of an eradication crew. This consisted of an assistant leader in the C.C.C.'s as foreman and a crew of seven enrolled men from the Damascus camp. The area covered by the crew was checked for Ribes missed by the scouts and Checker.

SCOUTING AND ERADICATION RESULTS
SUMMARY FOR UNAKA NATIONAL FOREST - 1933 and 1934

- 8 -

	No. pine areas worked	Acreage covered: White pine plus 900' pro.zone	Acreage covered: White pine only	Ribes pulled: Wild	Ribes pulled: Cult.	Time enlisted personnel: MD	Time enlisted personnel: EH	Cost of crew transportation	Period work performed
Virginia									
Camp F-5-Va., 1933 -	4	3817	920	317	0	100	574.4	*	July 17 - Oct. 6
" " 1934 -	6	595	487	240	30	26	156.1	$ *12.35	June 18 - July 7
Totals, Camp F-5-Va.	10	4412	1407	557	30	126	730.5	$ 12.35	
Camp F-6-Va., 1933 -	2	400	66	19	0	9	32.7	*	Sept.11 to 17
" " " 1934 -	10	800	370	459	0	31	173.8	$ 5.95	Apr. 5-May 7
Totals, Camp F-6-Va.	12	1200	436	478	0	40	206.5	$ 5.95	
Camp F-7-Va., 1933 -	7	870	220	14	0	14	146.2	*	Sept. 18 to 27
" " " 1934 -	6	1000	305	1644	30	28	101.5	$ 31.50	Apr. 23-May 23
Scouting Tot., F-7-Va.	13	1870	525	1658	30	42	247.7	$ 31.50	
Camp F-7-Va., Crew work									
Totals, 1934 -	1	23.5	5	5130	0	70	474.1	*	May 8 to 26
F-7-Va. Scouting and									
crew work, Totals, 1934	6	1023.5	310	6774	30	98	575.6	$ 31.50	
F-7-Va. Scouting & Crew									
work, Totals, 1933 & 34	13	1893.5	530	6788	30	112	721.8	$ 31.50	
Total for Va. 1933 & 34	35	7505.5	2373	6788	60	278	1658.8	$ 49.80	
Tennessee									
Camp F-7-Va. 1933 -	4	1120	375	0	2	16	83.7	*	Sept. 28-Oct. 6
" " 1934 -	7	585	161	0	0	24	155.0	$ 20.05	May 23-June 16
Total, Camp F-7-Va. -	11	1605	536	0	2	40	238.7	$ 20.05	
F-7-Va. Scouting & Crew work in Va. & Tenn.									
Totals, 1933 & 34	24	3498.5	1066	6788	32	152	960.5	$ 51.55	
Tennessee									
Camp F-11-Tenn., 1934-	19	1130	354	0	79	39	252.4	$ 24.95	July 12-Aug. 15
Totals, Tenn. 1933 & 34	30	2835	890	0	81	79	491.1	$ 45.00	
Grand Total for four Camps. 1933 & 1934	65	10340.5	3263	7823	141	357	2149.9	$ 94.80	July 17, 1933 - Aug. 15, 1934

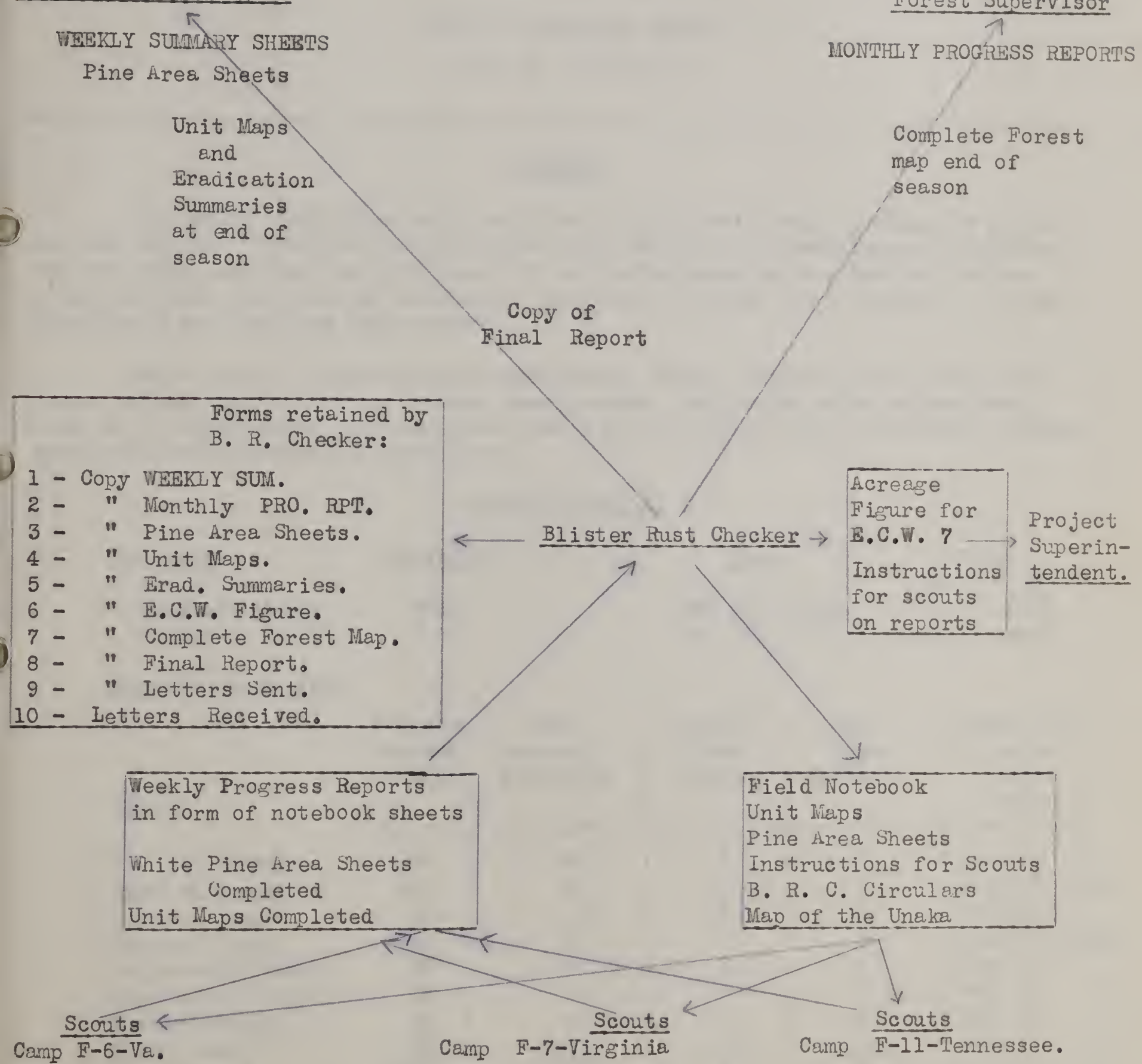
* Scouts rode to work on Timber Stand Improvement Trucks in 1933

W. H. Robens
8/15/34

BLISTER RUST CONTROL

Unaka National Forest

Organization Chart



Camp F-11-Tenn.
Bristol, Tenn.
August 15, 1934.

WHITE PINE BLISTER RUST CONTROL
Unaka National Forest

MONTHLY PROGRESS REPORT
July 26 - August 15

GENERAL

All B.R.C. activities were completed at Camp F-11-Tenn. during the period of this report. Scouting was continued until August 8, reconnaissance completed on the tenth, and the last four days of the period used by the Checker to complete all maps and reports summarizing results of blister rust control on the Unaka during the 1933 and 1934 seasons.

Ribes of all species were conspicuous by their absence on all white pine areas covered during the past three week's work. Many cultivated bushes were seen on reconnaissance, but none were found sufficiently close to national forest white pine to necessitate eradication.

CAMP F-11-Tenn.

Personnel	Position	Rate	Time MD	Time EH
Buckles, C. R.	Scout	$30 per month	11	66.5
Steagall, O. C.	"	30 " "	11	66.5

Scouting completed

Areas	Acreage cleared of Ribes	Pine acreage protected	Number Ribes pulled	Man-days worked	Inclusive dates worked 1934
Big Oak Branch	60	40	0	1	July 26
Riddles Creek	100	25	0	3	July 26 & 27
Caylors Creek	60	5	0	2	July 30
Weavers Creek	110	10	0	4	July 31, Aug. 1
Susie Mays Branch	60	12	0	2	Aug. 2
Big Spring Branch	60	10	0	2	Aug. 3
Barnett Tract	40	5	0	2	Aug. 6
Lyons Tract	50	20	0	2	Aug. 7
Totals	540	117	0	18	

Reconnaissance

July 30 - August 7 - Caylors Creek, Hatcher Creek, Weavers Creek,

Cold Spring Branch, Oppossum Creek, Big Spring Branch, Big Cane Lick, Susie Mays Branch, Barnett Tract, Lyons Tract, Big Arm Branch and Cleavet Spring Tract. Pine found in those areas listed above under "Scouting completed."

Reconnaissance (continued)

August 8 - 10 - All areas south of Iron Mt. and east of Mt. City - Bristol Road. Practically all of the national forest land in this section is at high elevation and no areas were found containing sufficient white pine to justify scouting.

Remarks

Scouts on reconnaissance with Checker on August 8 and 9th.

Mr. Swarthout plans to complete the blister rust work on the Forest and will add the data for Camp F-5-Tenn. and F-6-Tenn. in which he now has the work underway to the final report.

Checker to transfer to Marlington, West Virginia for duty August 27th.

Ward H. Robens

Blister Rust Checker

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STATISTICAL REPORT OF BLISTER RUST CONTROL WORK UNDER E.C.W.

State VIRGINIA — Year 1934

					Speedwell, Va., Camp F-5-Va.	Sugar Grove, Camp F-6-Va.	Damascus Camp F-7-Va.	TOTALS FOR STATE
Name of town where camp located and F. S. Camp number					3	2	2	5
No. towns where erad. performed					June 18, July 7	April 5 - May 7	April 23 - May 23	April 5 - July 7
Period work performed					2	2	3.7	2.6
Ave. Number enlisted men per day					1	1	1	1
No. tech. foremen and checkers								
Results of Ribes Erad. Work *	PUBLIC LANDS	Initial Erad.	Acreage eradicated		595	610	10233	2228.3
			Ribes pulled	Wild	240	459	6745	7444
				Cultivated	30	0	30	60
			Man hours enlisted p.	Erad. Ribes	1564	173.8	596.6	899.8
				Total time	208	248	808	1264.
		Re-Erad.	Acreage erad.				5	5
			Ribes pulled	Wild			29	29
				Cult.			0	0
			Man hrs. enlisted personnel	Erad. Ribes			6	6
				Total time			8	8
		Totals (Initial & Re - erad.)	Acreage erad.				1028.3	1028.3
			Ribes pulled	Wild			6774	6774
				Cult.			30	30
			Man hrs. enlisted personnel	Erad. Ribes			575.6	575.6
				Total time			816	816
Cost of crew transportation					$13.75	$10.65	$52.20	$76.60
Technical Foremen and Checkers	Individual Scouting for Ribes		Acreage erad.		177	35	141	353
			Ribes pulled		70	20	197	287
	8 Hr. Man Days On		Ribes scouting		12	3	7	22
			Crew work		0	0	5	5
			Supervision		5	13	27	45
	Wage Cost		Ribes scouting		$57.78	$14.44	$28.89	$101.11
			Crew work		0	0	$24.07	$27.07
			Supervision		$24.07	$62.59	$48.15	$134.81
			TOTAL WAGE		$81.85	$77.03	$101.11	$259.99

* Under the sub-headings "Acreage eradicated" and "Ribes pulled" include both the work done by the enlisted personnel and the Ribes scouting performed by the technical foremen and checkers. However, under "Man hours" record only the time of the enlisted personnel.

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/Signed/ W. H. ROBENS

8/15/34

W.O.H.

6/10/35

UNAKA NATIONAL FOREST

For Mr. Swarthout's report of work from two Tennessee camps, see pages 60 to 63, under Tennessee.

ANNUAL REPORT

OF

WHITE PINE BLISTER RUST CONTROL ACTIVITIES

IN

VIRGINIA

ENDING

September 30, 1934.

(To be followed by a Supplementary Report for three months ending December 31, 1934.)

(COPY)

Amendment No. 1
Washington, D. C.

AMENDMENT TO
MEMORANDUM OF UNDERSTANDING
Effective July 1, 1932
Between

—

THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, THE VIRGINIA FOREST SERVICE, AND THE VIRGINIA STATE ENTOMOLOGIST.

Cooperative Work in Controlling White Pine Blister Rust in Virginia.

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The undersigned mutually agree that the memorandum of understanding between the United States Department of Agriculture, Bureau of Plant Industry, the Virginia Forest Service, and the Virginia State Entomologist effective July 1, 1932, to continue in effect until June 30, 1933, shall be continued in full force and effect in all its provisions for the two year period ending June 30, 1935, with the exception of paragraphs D-2 and D-6 which shall be amended to read as follows:

D-2, That this memorandum of understanding shall take effect July 1, 1933 and continue in effect until June 30, 1935, provided that either party may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

D-6. That for the two year period, July 1, 1933, to June 30, 1935 the Virginia Forest Service and its cooperators will expend about $1,010.00 and the Federal Government in behalf of the United States Bureau of Plant Industry about $38,000.00 in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $40,000.00.

April 7, 1934 — F. C. Pederson
State Forester, Virginia Forest Service.

April 24, 1934 — G. T. FRENCH
G. T. French
Virginia State Entomologist.

Apr. 30 - '34. — K. C. KELLERMAN
K. C. Kellerman
Acting Chief, Bureau of Plant Industry, U.S. Dept. of Agri.

Annual Report of White Pine Blister Rust Control Activities in Virginia, Ending September 30, 1934.

FOREWORD

White Pine Blister Rust Control is carried on in Virginia by the United States Forest Service in the George Washington National Forest, by the United States Park Service in the Shenandoah National Park, and by the United States Department of Agriculture, Bureau of Entomology and Plant Quarantine, Division of Plant Disease Control, Blister Rust Control, on all non-federal lands whether public or private.

The cooperative work carried on in Virginia by the Bureau of Entomology & Plant Quarantine is in accordance with a Memorandum of Understanding between the United States Department of Agriculture, Bureau of Plant Industry, The Virginia Forest Service, and the Virginia State Entomologist, effective July 1, 1932, and, in accordance with amendment No. 1 to this Memorandum of Understanding, dated April 30, 1934.

PERSONNEL

Virginia is a part of the Southern Appalachian District and is under the technical supervision of Mr. R. G. Pierce, Associate Pathologist, Regional Supervisor.

The State Cooperators are Mr. F. C. Pederson, State Forester, and Mr. G. T. French, State Botanist, and Entomologist.

The N. E. A. Blister Rust personnel in Virginia consists of a State Leader, J. G. Luce, Jr., whose headquarters are in the State Foresters Office, University, Virginia, and three full-time agents:- C. A. Stevens with headquarters at Massie's Mill; W. M. Early, Jr., with headquarters at McDowell; D. D. Withers with headquarters at Rocky Mount.

During the eradication season, the following agents assisted in control operations:-

W. T. Holt, Agent	B. L. Kiser, Scout
G. C. Cowdrey, Agent	A. A. Sproul, Scout
L. M. Walker, Jr., Agent	T. H. Lillard, Scout
W. H. Miller, Scout	W. M. Stewart, Scout

D. H. Fitzwater, Blister Rust Checker

The list of eradication season personnel follows:

1 - State Leader -	Bureau of Entomology & Plant Quarantine,				USDA
5 - Full-time Agents -	"	"	"	"	"
1 - Blister Rust Checker -	"	"	"	"	"
6 - Scouts -	"	"	"	"	"

Foremen, strawbosses, and laborers were obtained from The Civilian Conservation Corps and The Reemployment Service. Strawbosses and laborers were employed thirty hours per week while foremen, temporary scouts, scouts, and agents were required to work forty-four or more hours per week as the efficiency of the work demands.

In the Shenandoah National Park, the White Pine Blister Rust control program is under the direction of Mr. E. H. Francis, Assistant Forester.

In the George Washington National Forest, Mr. W. J. Cullen, Cultural Foreman, is in charge of blister rust control work.

In the Unaka National Forest, Mr. W. H. Robens, Cultural Foreman, is in charge of blister rust control operations.

WHITE PINE ACREAGE

Native white pine occurs in commercial quantities in the mountain and foothill region of the State extending from Frederick County on the north to Washington on the southwest. It is estimated that there are over 233,000 acres of woodland having 5% or more of white pine. Of this area it is estimated that 85,441 acres are in George Washington and Unaka National Forests. In addition the National Park Service is acquiring by gift from Virginia approximately several thousand acres of white pineland in the Shenandoah National Park area. This will reduce the area in private ownership to about 145,000 acres. The largest acreage in white pine occurs in the eleven counties of Alleghany, Amherst, Augusta, Bath, Bland, Botetourt, Carroll, Floyd, Highland, Rockingham and Wythe. Smaller areas of white pine are reported from each of the twenty-five counties of Albemarle, Bedford, Craig, Fauquier, Franklin, Frederick, Giles, Grayson, Greene, Madison, Montgomery, Nelson, Page, Patrick, Pulaski, Rappahannock, Roanoke, Rockbridge, Russell, Scott, Shenandoah, Smyth, Tazewell, Warren and Washington.

WHITE PINE PLANTATIONS

Prior to 1921 the records for white pine plantations are incomplete but probably between 25 and 50 acres of white pine had been set out. Between 1921 and 1935, 150,031 white pines from the Virginia Forest Nursery had been distributed for planting in counties of Virginia. White pine occurs scatteringly as ornamental trees either singly or in groups in many places in the State, particularly in the Piedmont and mountain sections.

WHITE PINE LUMBER PRODUCTION -

1927	3,683,000	Ft. B. M.
1928	6,137,000	" "
1929	6,418,000	" "
1930	9,820,000	" "
1931	8,037,000	" "
1932	3,648,000	" "

- Figures according to United States Department of Commerce, Bureau of the Census. The white pine lumber cut of 1931 was worth, at $21.49 per M feet, $172,715.00 f. o. b. mill. The lumber cut of 1932 was worth, at $20.02 per M feet, $73,033.00.

According to Forest Service statistics there are 69 million feet of white pine saw timber, and 376,000 cords of white pine on cordwood areas in Virginia. The cordwood is estimated at 2 cords per M feet to be the equivalent of 188 million feet. The stand of saw timber and cordwood would thus total 257 million board feet.

The saw timber is estimated as worth --------$473,340

and the cordwood " " " --------658,000

The total value thus being ----------$1131,340

NURSERIES THAT GROW FIVE-LEAVED PINES

Mrs. E. C. Arey, Danville, Virginia
Campbell County Nurseries, Lynchburg, Virginia
Hedge Lawn Nursery, Roanoke, Virginia
Moses Nursery, Waynesboro, Virginia
Page Valley Nursery, Luray, Virginia
W. E. Showalter, Vienna, Fairfax County, Virginia
Simmons Nursery, Longdale, Virginia
Stabler Nursery, Fairfax, Virginia
Valley View Greenhouses, Charlottesville, Va.
J. B. Watkins & Brother, Midlothian, Chesterfield County, Virginia

Certified to Ship Inter-State

Alta Vista Nurseries, Alta Vista, Virginia
E. W. Jones Nursery Company, Woodlawn, Virginia
Titus Nursery Company, Waynesboro, Virginia
Virginia Forest Service, University, Virginia
Westcott Nursery Company, Falls Church, Virginia

RIBES

1. Cultivated Species.

A large number of cultivated ribes have been eradicated in Virginia this season. Ribes nigrum, ribes vulgare, ribes sativum, ribes grossularia and ribes odoratum have been found in most of the counties in which eradication has been in progress.

There has been a wide variance in the attitude of the owners of cultivated ribes in regards to the removal of their bushes. Some have willingly assisted in destroying their plants, while others have threatened to resort to firearms to retain them. The fact that 12,877 cultivated bushes have been eradicated since June first bears witness ~~to the fact~~ that the field agents have been persistent, methodical and efficient in their work.

In the cases where cultivated ribes were not pulled, due to strenuous opposition by the owners, records of the location of these bushes were made and they will be inspected annually. Repeated attempts will be made to pull these bushes in the future.

2. Wild Species.

Of the wild species of ribes, ribes rotundifolium, the round leaf gooseberry is more numerous and wide-spread than any other. Although no definite check-up of the whole state has been made by the present BRC personnel, it appears that this species is to be found in the Virginia mountains from Maryland, south to the North Carolina and Tennessee borders.

Ribes cynosbati - the pasture or prickly gooseberry appears to range only along the westerly mountains of the state i. e. west of the Shenandoah valley. Only one report of its occurrance in the Blue Ridge Mountains, near Snowden, has been received. As yet, the range of this species in Virginia is only roughly known. Northward it ranges well into Shenandoah County, at least. Southward it may reach North Carolina and Tennessee. But until more complete information is obtained from the winter survey now in progress, only its range eastward is very definite.

Ribes glandulosum - the skunk currant, as far as is known, occurs only in the highest peaks and ridges of the mountains on the southern edge of Virginia. In Maryland it has been found in the extreme western part of the state. Why it has jumped nearly into Tennessee without a seedling between is an ecological mystery that we are anxious to solve.

Ribes americanium - the wild black currant has been found in only a few spots in Virginia. At the beginning of this year's eradication season it was known to grow at one site near Waynesboro, Augusta County. Since then, in Alleghany County, it was discovered in Kincaid Gorge; in Bath County, at two locations on Cedar Creek, and, on one at Warm Springs Gap. In Amherst County, it was found at one spot near Rocky Row Run; in Rappahannock County it was found on two sites. Its range seems to be extensive but its occurrence rare.

In general, ribes are found throughout the white pine area, but are far more abundant in the northern and central white pine counties than in the southern. Wild ribes occur from a few to a thousand or more per acre.

As a compensating factor to their pernicious habit of serving as alternate host to 'cronartium ribicola', the white pine blister rust, wild, as well as cultivated gooseberries and currants, are used in making pies, jellies, marmalade and other such delicacies. Also, to some extent the ripened berries are used by manufacturers of wine and vinegar.

The values of ribes berries, as food for wild life must not be overlooked. Plans are under way in Virginia to follow other states in replacing gooseberries pulled with other mast-producing bushes or grains. The sowing to be accomplished at time bushes are pulled.

RIBES ECOLOGY

In the northern counties, ribes rotundifolium are rarely found below an elevation of 1500 feet. The lowest elevation at which this species has been observed was at 980 feet in Madison County. Probably these were transplanted bushes. Incidentally, one of the bushes at this site was infected with blister rust in the telial stage. In Botetourt County, the lowest elevation of rotundifolium was 1200 feet. All other bushes found were at least 2000 feet above sea level - usually 2500 feet or more.

Ribes rotundifolium usually infests pastureland, rock slides and outcrops, rocky hollows and stream sides. While usually more abundant on the northern exposures of the mountains it frequents, it may be run across in southern exposures well down towards North Carolina.

Ribes cynosbati occurs at much lower altitudes than rotundifolium. While it too prefers to grow on or near rocks, it may be found straying off into quite open hardwoods into places where rotundifolium never grows. As a general rule, it has been found growing across and for a short ways up the sides of the mountain hollows that contain pine. Consequently its eradication is fairly easy. Both cynosbati and rotundifolium have been observed growing ten to twenty feet above the ground in dead trees.

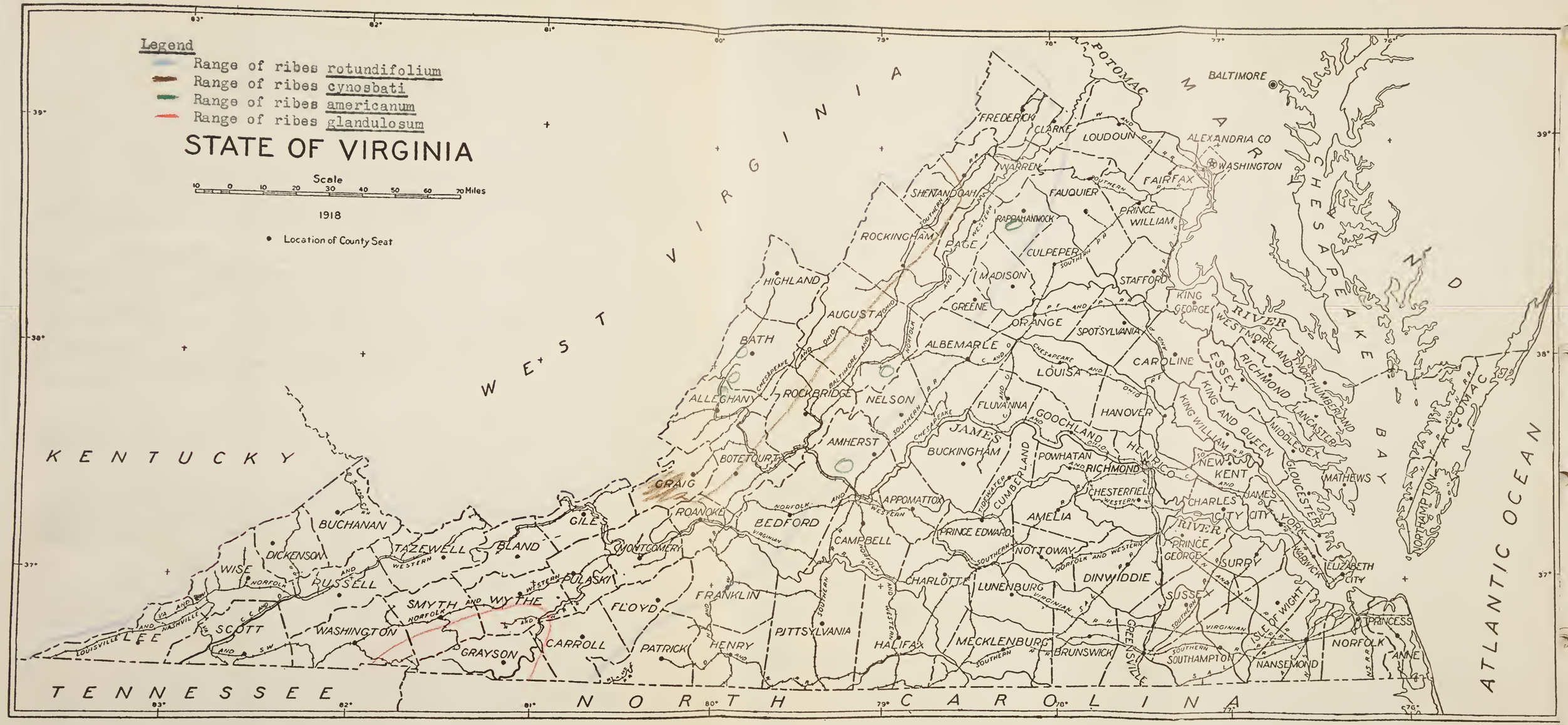
Ribes americanum has been found at elevations from 1400 in Bath County to 2000-2500 in Rappahannock County. It frequents moist, rich soil. It is sometimes cultivated.

Ribes glandulosum occurs at 3000-4000 feet elevations in the southerly mountains; mostly on mossy rocks adapted to its trailing habit.

NURSERIES THAT GROW RIBES

Louis A. Deshayes, Vienna, Virginia
Klehms' Virginia Nurseries, Churchland, Virginia
J. M. Lewis & Son, Cascade, Virginia
W. E. Showalter, Vienna, Virginia
J. B. Watkins & Brother, Midlothian, Virginia

September, 1932.


Legend
Range of ribes rotundifolium
Range of ribes cynosbati
Range of ribes americanum
Range of ribes glandulosum
STATE OF VIRGINIA
Scale
10 0 10 20 30 40 50 60 70 Miles
1918
• Location of County Seat
WEST VIRGINIA
KENTUCKY
TENNESSEE
NORTH CAROLINA
ATLANTIC OCEAN
CHESAPEAKE AND POTOMAC
BALTIMORE
WASHINGTON
ALEXANDRIA CO
FREDERICK
CLARKE
LOUDOUN
FAIRFAX
PRINCE WILLIAM
FAUQUIER
WARREN
SHENANDOAH
ROCKINGHAM
RAPPAHANNOCK
CULPEPER
PAGE
MADISON
STAFFORD
KING GEORGE
WESTMORELAND
RICHMOND
NORTHUMBERLAND
LANCASTER
ESSEX
KING AND QUEEN
KING WILLIAM
MIDDLESEX
GLOUCESTER
MATHEWS
HIGHLAND
AUGUSTA
GREENE
ORANGE
SPOTSYLVANIA
CAROLINE
BATH
ALBEMARLE
LOUISA
HANOVER
ALLEGHANY
ROCKBRIDGE
NELSON
FLUVANNA
GOOCHLAND
HENRICO
NEW KENT
JAMES CITY
YORK
AMHERST
BUCKINGHAM
POWHATAN
RICHMOND
CHARLES CITY
BOTETOURT
CRAIG
ROANOKE
BEDFORD
APPOMATTOX
CUMBERLAND
CHESTERFIELD
AMELIA
PRINCE GEORGE
SURRY
BUCHANAN
GILE
MONTGOMERY
CAMPBELL
PRINCE EDWARD
NOTTOWAY
DINWIDDIE
WARWICK
ELIZABETH CITY
DICKENSON
TAZEWELL
BLAND
WISE
RUSSELL
PULASKI
SMYTH AND WYTHE
FLOYD
FRANKLIN
CHARLOTTE
LUNENBURG
SUSSEX
ISLE OF WIGHT
PRINCESS ANNE
NORFOLK
LEE
SCOTT
WASHINGTON
GRAYSON
CARROLL
PATRICK
HENRY
PITTSYLVANIA
HALIFAX
MECKLENBURG
BRUNSWICK
SOUTHAMPTON
NANSEMOND

WHITE PINE BLISTER RUST

What It Is

The White Pine Blister Rust, cronartium ribicola, is a fungus disease that is capable of infecting and killing nearly every species of the five-leaved pines. Fortunately, it is restricted to these trees.

The rust has as an alternate host, gooseberry and currant bushes, as it makes its way from pine to pine. Direct infection from pine to pine does not take place. Wind blown spores carry the disease in the spring from pine to ribes and in mid-summer and fall bear it from the ribes back to the pines. The disease remains on the pine once it is infected; but, as it is confined to ribes leaves, ribes must be reinfected each year for the disease to be present thereon.

The disease enters the pine through the needles, works its way down into the branch or trunk and kills the same by a girdling process.

This disease is one of the most damaging of all the forest-tree rusts. Reproduction suffers the greatest damage with the rate of the damage diminishing as the age of the trees increase.

As the spores that infect pines are fragile and short-lived, and, not as a rule capable of infecting trees over 900 feet away, protection of the pine stands is maintained by eradicating all ribes growing within 900 feet thereof.

Brief History

The White Pine Blister Rust imported from Europe on seedlings of Pinus Strobus between 1898 and 1908 is the cause of one of our most serious diseases of the forest. This rust, originating in Asia, was first observed in Russia in 1854. By 1883 the rust was well distributed throughout Europe, and in 1892 it made its appearance in England.

The rust is now generally distributed throughout the northwestern and Lake States region of the United States wherever Pinus Strobus is found. Also it has been carried into the Pacific northwest region, infection being quite general in Washington, Oregon and Idaho.

Status in Virginia to 1934

The rust though discovered first in 1931 in Frederick and Rappahannock Counties on Ribes has been present in Augusta County probably ten years on white pine. Spot infections were found on cultivated red currants in Page County in 1932, and on wild gooseberries in Page and Rappahannock Counties in 1933, and on white pine and wild gooseberries in Augusta and Madison Counties in 1933. No large scale damage has been uncovered to date.

Control Work in Virginia Before 1934

From 1928-1933, reconnaissance surveys and eradication work on a small scale had been under way in Virginia. Sufficient funds were not available for large scale eradication operations but a great deal of preliminary work was done by Mr. R. G. Pierce and various assistants obtained from the U. S. Forest Service.

In 1933, the following men were engaged in Blister Rust Control in Virginia:

Unit	Checker	Date Work Began	Date Work Closed
George Washington National Forest	W. J. Cullen	Aug. 9	Oct. 11
" " " "	G. U. Wolcott	June 16	Sept. 30
Unaka National Forest	W. H. Robens	July 17	Oct. 6
Shenandoah National Park	E. H. Francis	June 1	Cont'd thru Dec.
" " "	D.H.Fitzwater	July 6	Aug. 15
State CCC Camps	Clyde Stevens	Aug. 10	Cont'd thru Dec.

In addition eradication work was carried on by Forest Ranger, Abner Casey, on the George Washington and by Mr. Payne on the Watershed of Dry River, owned by City of Harrisonburg. Nursery inspection sanitation work was carried on by Mr. C. R. Willey of the Virginia Department of Agriculture, and Mr. R. A. Sheals of the United States Department of Agriculture.

BLISTER RUST CONTROL IN 1934

1. SPREAD OF THE BLISTER RUST

In 1933 in the George Washington National Forest, Mr. W. J. Cullen while on a reconnaissance trip through the Dry River Ranger District with Roy G. Pierce taking in North River, Little River, Big Run, Briery Branch and a trip to Sugar Grove, West Virginia, discovered the blister rust for the first time on the Forest on August 7th. Both white pine and Ribes were found diseased at Milestone 12.6, 2 miles up North River from Camp Todd. This was in an area from which Ribes had never been removed because of the scarcity of the pine.

Later three infected pines and one infected Ribes were found about 40 chains south of Camp Todd, close to the road. Cullen and Pierce examined these trees and it seemed to the latter that the infection dated back about 11 years on one tree. Another infection was found down North River some ten miles distant from the first location.

The first pine infection in Virginia was found by Mr. Francis and his men on August 3 on the southeastern slope of Hawksbill Mountain; later infections were found on rotundifolium in Sexton Cabin Area. Mr. R. A. Sheals located the rust on Ribes along the Lee Highway less than a half mile west of Thornton Gap, while Mr. Clyde Stevens located the rust on Ribes rotundifolium on the west slope of Pignut Mountain about 10 miles northwest of Sperryville. This is either inside the proposed Park Area or close to it. The infections in the Park were found in Page, Madison, and Rappahannock Counties.

Infections Found Since 1933.

Since August 1933, Mr. W. J. Cullen has located 58 infections on pine and 8 on ribes. These infections were in Augusta and Rockingham Counties on the George Washington National Forest.

In the Shenandoah National Park, Mr. E. H. Francis has located a number of infections on pine and ribes, which were within the limits of infection already observed.

Mr. D. H. Fitzwater, Blister Rust Checker, uncovered one ribes infection on Dry River and one on Skidmore Fork of the Harrisonburg Watershed in Rockingham County.

Mr. C. A. Stevens located additional infections on pine and ribes in Rappahannock County, and a new infection on ribes in Rockingham County at Deane Mountain. Later in the season he reported an infection on ribes at Humpback Mountain within the borders of the Natural Bridge National Forest.

On August 24, 1934, Mr. R. G. Pierce found infection in the telial stage on ribes rotundifolium at an elevation of 980' in Madison County. This is the lowest infection observed.

II. PINE LOCATION AND PRE-ERADICATION SURVEY

Mr. E. H. Francis' men surveyed 3142 acres of white pine in the Shenandoah National Park in the early months of 1934.

640 acres were surveyed by Mr. Ward H. Kobens in the Unaka National Forest preparatory to his summer's work.

Working on private lands bordering the Shenandoah National Park, Mr. C. A. Stevens scouted the following acreage of white pine in the counties named:- 187 acres in Greene, 638 in Madison, 1644 in Page, 932 in Rappahannock, 101 in Rockingham.

The results of these surveys are shown in Tables I, II, and III below:-

Table 1. Showing Results of Preeradication Survey[c] of Pine Areas on National Forest and National Parks from E.C.W. Camps, 1934.

Name of National Forest or Park	Acres Pine to protect	Acres to be worked	Estimated man-days labor	Percent survey completed
Shenandoah National Park	3142	8671	11200	100%
Unaka National Forest	640	1400.3	128	100%
Totals	3782	10071.3	11328	100%

[c] Does not include any survey made during Eradication Season.

Table 2. Showing Results of Preeradication Survey of Pine Areas on State and Private lands from E.C.W. Camps in 1934.

Name of County	Acres Pine to protect	Acres to be worked	Estimated man-days labor	Percent survey completed
Greene	187	1305	40	90%
Madison	638	3490	1	90%
Page	1644	11090	320	90%
Rappahannock	932	5705	370	80%
Rockingham	101	835	165	15%
Totals	3502	22425	896	-

Table 3. Showing Results of Preeradication Survey Work done by all Agencies in 1934.

Agency	Acres pine to protect	Acres to be worked	Estimated man-days labor
E.C.W.	7284	32496.3	12224

III. LOCAL CONTROL - RIBES ERADICATION

Eradication work was carried on by crews of four to seventeen men. Behind every six to eight men, a checker mopped up missed bushes. Following the checkers came the crew strawboss, who also checked for missed bushes, etc.

Due to the late start in June the agents were hard-pressed to locate, scout, survey and map pine areas ahead of two or more crews. In an endeavor to keep the trained crews together and at the same time allow the agent more leeway, the crews, by spreading out considerably, worked a large number of acres that under other circumstances would have been worked by scouting. This system worked very effectively.

The following Tables - A, B, C, D, - show statistically the work done during the eradication season up to September 30, 1934.

Table A. Showing Results of local control.

Work done in National Forests and National Parks and on Private and State lands by E.C.W. Camps.

Name of National Forest and Park or County if non-Federal land	Acres Pine Protected	Acres Worked	No. Ribes Pulled	Man Days Labor
Unaka National Forest	1177	2233.3	7503	271
George Washington National Forest	1180	4915	18524	679
Shenandoah National Park	2447	6949	605224	6541
Totals - Federal Lands	4804	14097.3	631251	7491
Albemarle County	240	1100	9660	140
Greene County	109	845	5365	121
Totals - Non-Federal Lands	349	1945	15025	261
Grand Totals	5153	16042.3	646276	7752

Table B. Showing Local Control by N. R. A. Labor

County	Acres pine protected	Acres Worked	No. Kibes Pulled	Man days labor
Alleghany	1459	4875	1773	21 1/2
Amherst	125	407	35	5 1/4
Augusta	1245	5456	13775	292 1/2
Bath	2873	6486	72662	604 15/16
Bedford	67	553	-	8
Botetourt	1164	3785	47	15 6/16
Greene	137	875	5395	32 1/8
Page	2451	14110	43625	296 3/16
Rappahannock	666	2995	107465	332 3/4
Rockbridge	600	2672	-	5 9/16
Rockingham	3260	13367	111650	1307 5/8
Warren	923	5923	5145	134 5/16
Totals	14970	61504	361572	3056 2/16

Table C. Showing Local Control Work Done by all Agencies.

Agency	Acres pine protected	Acres Worked	No. Kibes Pulled	Man days labor
N. R. A.	14970	61504	361572	3056 2/16
E. C. W.	5153	16042.5	646276	7752
Total	20123	77546.5	1007848	10808 2/16

Table D. Showing Ownership of Land Upon Which Local Control Work was Done.

Ownership	Source of labor	acres pine protected	Acres Worked	No. Kibes Pulled	Man days
National Forest	CCC	2357	7148.3	26027	950
National Park	CCC	2447	6949	605224	6541
State Forest	-	-	-	-	-
Municipal	NRA	300	384	4275	46
Private	NRA	15342	60920	356920	2650
Total		20446	75401.3	992446	10187

4. REPORT ON CHECKING BLISTER RUST CONTROL WORK IN MARYLAND, VIRGINIA AND WEST VIRGINIA.

By D. H. Fitzwater,

September 7, 1934.

The work of checking in the States of Maryland, Virginia and West Virginia was begun June 11 and ended September 5.

In each state the State Leader was contacted from whom information was obtained as to which localities had blister rust control work in progress or completed. The agents of these localities were then contacted. The writer was shown by maps or was accompanied personally by the agents over the areas where Ribes had been removed either by crews or scouts. The ease of finding areas was greatly increased when the agent was able to go with the writer over the area. Also it gave the agent first hand information of the condition remaining after work had been completed.

In checking areas, the entire work in the separate localities was not attempted to be covered, but rather samples of the work of each agent. To check all the work of each state would be an impossibility for a single person as the season for checking was limited.

The method of checking was by means of general survey and by laying out 1/16 acres plots over the particular block under inspection. The 1/16 acre plots were laid out by string measured in advance and knotted at 52 ft. intervals. A square 52 x 52 ft. gives the desired 1/16 acre. The plots were spread throughout the area so as to obtain a comprehensive view of the block as a whole. The live stem of bushes found remaining was measured and tabulated on check report sheets.

General checking was used in areas where plots seemed inadvisable. In a general observation much can be noted of the condition of the area without regard to live stem remaining. It seems best that in checking an area both check plots and a general observation should be made. Cliffs generally were covered by a thorough scouting as they are usually too steep for laying out string plots successfully.

Observations

From the check work in Maryland, Virginia and West Virginia several observations have been made by the writer of conditions in general.

1. The degree of efficiency in eradication work cannot be judged by the percentage of bushes removed, but rather must be regarded with respect to the amount of live stem remaining.

2. Crews must be continually warned against hanging bushes too loosely and not shaking the dirt from the roots. In one place, a very large bush was found which had fallen and taken root again, heavily infected with blister rust. In each state such cases of bushes were found that had dropped and taken root.

3. Crowns and old roots are left by nearly every crew. It does not take long for a sprouting root to become a good sized bush again. The neglect of crews to remove the entire bush may be due to hand pulling without the use of picks or hooks. It is interesting to note that each locality may find it necessary to adapt a pick to their own particular type of soil (or rock).

4. A true conception of the condition of a worked area cannot be obtained by a general scouting alone. One tends to travel too fast and miss bushes that are hidden or small. The 1/16 acre plot shows what remains in that limited space. Also it is necessary to cover every foot of the 1/16 acre slowly so as to find what remains!

5. The 1/16 acre check plots may not seem fair to the crew since in covering the plot, the checkers move much slower and more carefully than the crew. Nevertheless it is the live stem remaining on bushes over 6 inches in height which is important. Primarily, the object of eradication is to lower the average feet of live stem per acre to a safe margin.

6. Crews should be constantly on the alert to notice infection on Ribes leaves and pine. At one area in particular the rust was found in an area covered by the crew on bushes that were missed. The rust was not known to be in this locality.

7. Scouts seem to have a tendency to take too wide strips where bushes are present and also have the habit of determining beforehand where the bushes are located, that is, instead of examining a spot he is inclined to conclude that the bushes could not grow there.

8. Bushes may be missed by crews because they are going too fast or they are running their strips too wide. Also rough and bushy country is hard to work in, consequently bushes will be missed. Failure to examine clumps of bushes often results in missing Ribes. CCC crews in general are disinterested in eradication work and do poor work unless constantly supervised.

9. Bushes under cover cannot be considered safe from infection. One small bush heavily infected with blister rust was found completely submerged beneath other growth, while not 50 feet away was an older bush in the open completely free from infection.

10. Crown sprouts put on growth very rapidly. A crown left was found with 3 feet of live stem grown in two months (three 1 ft. stalks).

11. String is by far superior to paper. The crew as a whole is able to line itself on the string while paper causes considerable trouble in keeping together. Scouts are using string in some places with excellent results. Where crews have used string, the area is easily found and checked.

12. A great part of poor work may be the fault of the foreman in charge of the crew. If he becomes careless bushes missed by the crew are missed by him, so resulting in poor work. Foremen must consistently check his crew.

13. While it is true that the straw boss should check more carefully behind his crew, it is also true that it is the district agent who is responsible for the efficiency of the work and who should determine whether the work was well or poorly done. Obviously some of the district agents did not run sufficient checks or run them carefully enough for the tables on checking in the three states show too high a number of bushes remaining on too many blocks.

Suggestions for 1935

It seems advisable that checking should be done more extensively and carefully in each state by the individual organizations. Only through careful checking can the crew work be judged satisfactory or not. Areas to be reworked should be done before the crew leave the area, hence some checking by district agents should take place while eradication work is in progress.

Picks or hooks should be issued to crews as through use of these crowns and roots will be removed. Some agents say that they do not have the time to check the work of their crews. If the agent has scouts turning up work it would leave agents sufficient time for checking.

Respectfully submitted,

D. H. Fitzwater
Agent

5. LEGISLATION

Legal authorization for the eradication of both wild and cultivated ribes, whether or not infected with blister rust, growing within 1500 feet of white pine stands in and west of the Blue Ridge Mountains is obtained under quarantine No. 3 established May 25, 1934 by the Department of Agriculture and Immigration under authority of an Act of the General Assembly known as the State Crop Pest Law, Chapter 39, Sections 870 to 905 of the Code as amended.

6. PLANS FOR 1935.

In 1935 the minimum stocking of white pine that will be considered worthy of protection from the blister rust will be:--

Under 6 feet in height--200 trees per acre
From 6 - 15 feet in height-- 125 trees per acre
From 16-30 feet in height-- 100 trees per acre
From 30 feet up in height--75 trees per acre

This raises the amount of pine required for protection to twice that of the basis used in 1934.

Using this new basis, it is planned to survey all the remaining white pine areas in Virginia, this winter and spring so that by late spring, pine area record sheets for all the white pine counties of Virginia will be completed.

In addition, enough pine areas will have been surveyed and spotted to keep crews busy throughout the eradication season.

The keeping of records in the headquarters office is being thoroughly systematized in order that costs and eradication data will be available at a few minutes notice.

With the experience gained during the past eradication season and the winter ahead, I feel that next season will open with a rush and the results will more than meet expectations.

Respectfully submitted,

J. G. Luce, Jr.
State Leader,

JGL:ASD
November 19, 1934.

TABLE #1 - RESULTS OF PREERADICATION SURVEY
WHITE PINE AREAS - 1934 - E. C. W. Work

Camp	County	Name of Forest, Park or State Work	Number of Projects	Areas white Pine to be Protected	ACRES TO WORK			Estimated Man Days Work Required			Man Days Used			COSTS				Percent of Preeradication completed 10/1/34
					Crew	Scout	Total	Crew	Scout	Total	Asst.	Mapper	Total	Asst.	Mapper	State	Total	
Va. P60 & 74	Greene	Virginia State	8	187	110	1195	1305	35	5	40	0	9	9	$ 0.00	$72.50	$0.00	$72.50	90%
" P74	Madison	" "	16	638	0	3490	3490	0	1	1	0	17	17	$ 0.00	160.15	0,00	160.15	90%
" P68 & 74	Page	" "	70	1644	650	10440	11090	260	60	320	47	62	109	$75.20	503.15	0.00	578.35	90%
" P68	Rappahannock	" "	32	932	1165	4540	5705	360	10	370	21	22	43	$33.60	215.00	0.00	248.60	80%
" P74	Rockingham		5	101	335	500	835	160	5	165	0	3	3	$ 0.00	19.50	0.00	19.50	15%
			131	3502	2260	20165	22425	815	81	896	68	113	181	$108.80	970.30	-	$1079.10	-
SCS #1-2-3-4	Shenandoah National Park		8	3142	4608	4063	8671	5600	5600	11200	35½	27½	63	$ 35.50	$81.75	-	$117.25	100%
F-5-Va. -	Preeradication Work Completed During 1933 Season Figures Not Available																	
F-6-Va. -	Wythe, Unaka National Forest		2	185	-	320	320		16	16	2	3	5	$ 2.00	$14.40		$16.40	100%
" -	Smyth " " "		4	145	-	405	405		16	16	0	5	5	-	24.00		24.00	100%
F-7-Va. -	" " " "		1	125	-	550	550		8	8	0	0.5	0.5	-	2.40		2.40	100%
" -	Washington " " "		5	185	25.3	100	125.3	70	18	88	2	6	8	2.00	19.20		21.20	100%
			12	640	25.3	1375	1400.3	70	58	128	4	14.5	18.5	$4.00	$60.00		$64.00	100%
TOTALS			151	7284	6893.3	25603	32496.3	6485	5739	12224	107½	155	262.5	$148.30	$1112.05	-	$1260.35	-

TABLE A. LOCAL CONTROL -- RESULTS OF RIBES ERADICATION, 1934. E. C. W.

No. of Camps	Forest, Park or State and County worked	No. of Projects	No. of Planting Sites	Acres of White Pine Protected	Acres Worked			Ribes Pulled				Man Days Labor Used			Man Days Super. Checker other than field	Costs			Total Cost Per Acre Worked	Ownership
					Crew	Scout or Agent	Total	Crew	Scout or Agent	Total	Ribes per Acre	Crew	Checker or Scout	Total		Labor	Supervision Checker	Total		
First Eradication																				
Va. P-60	State Albemarle	6	0	240	400	700	1100	8380	1280	9660	8.7	105	35	140	4	$ 105.00	$ 347.59	$ 452.59	$ .41	Private
Va. P-60	State Greene	5	0	109	205	640	845	5255	110	5365	6.3	98	23	121	2	98.00	248.05	346.05	.41	Private
Va. F-5	Forest Unaka	6	0	487	-	595	595	-	270	270	0.4	-	46	46	3	46.00	67.20	113.20	.19	Public
Va. F-6	Forest Unaka	10	1	370	-	610	610	-	459	459	0.7	-	47	47	6	47.00	72.00	119.00	.20	Public
Va. F-7	Forest Unaka	6	0	310	23.3	1000	1023.3	5130	1615	6745	6.6	70	105	175	5	175.00	168.00	343.00	.33	Public
CCC 2	George Washington	5	1	319	649	685	1334	4968	34	5002	3.7	177	6.2	183.2	2.4	179.40	75.74	255.14	.19	Federal
CCC 1-2-3-4	Shenandoah Nat'l. Park	8	0	2309	5570	1296	6866	552425	27274	579699	84.5	5309	1155	6464	70	6735.30	2491.78	9227.08	1.34	Federal
Total First Eradication		46	2	4144	6847.3	5526	12373.3	576158	31042	607200	49.7 Av.	5759	1417.2	7176.2	92.4	$7385.70	$3470.36	$10856.06	$ .877 Av.	
Second Eradication																				
Va. F-7	Forest, Unaka	1	0	10	0	5	5	0	29	29	5.8	0	3	3	0	$ 1.00	$ 6.80	$ 7.80	$ 1.56	Federal
CCC 2	Forest, Geo Wash.	9	2	861	1754	1827	3581	13432	90	13522	3.8	479	16.8	495.8	6.6	486.00	204.78	690.78	.19	Federal
CCC 2	Park - Shenandoah ~~Forest~~	2	0	138	80.2	3	83	25133	392	25525	307.6	73	4	77	-	73.00	5.00	78.00	.94	Federal
Total Second Eradication		12	2	1009	1834.2	1835	3669.2	38565	511	39076	10.7 Av.	552	23.8	575.8	6.6	$560.00	$216.58	$776.58	$ .21 Av.	
Grand Total		58	4	5153	8681.5	7361	16042.5	614723	31553	646276	42.9 Av.	6311	1441	7752	99	$7945.70	$3686.94	$11637.64	$ .725 Av.	

TABLE #5. LOCAL CONTROL - RESULTS OF RIBES ERADICATION. 1934. N. R. A.

County	Number of Project	Acres White Pine Protected	Acres Worked by			RIBES BUSHES PULLED						Total All Ribes	Number Per Acre	Man Days Labor Used			Man Days Supervision State Leader	COSTS					Ownership
						Crew		Scout & Agent		Total								Labor	Supervision		Supplies and Equipment	Per Acre Worked	
First Eradication			Crew	Scout	Total	Wild	Cult	Wild	Cult	Wild	Cult			Crew	Scouts & Agents	Total			Scouts	Dist. Agt. State Leader and Clerks			
Alleghany	11	1459	15	4860	4875	834	65	729	145	1563	210	1773	.364	5	16 8/16	21 8/16		$ 18.00	$ 35.00	$ 21.86		$0.0550	Private
Amherst	2	125	-0	407	407	-	-	35	-	35	-	35	.086	0	5 4/16	5 4/16		-	7.60	34.49		0.1034	Private
Augusta	7	1245	2438	3018	5456	13045	-	450	280	13495	280	13775	2.479	172 8/16	120	292 8/16		630.00	477.10	182.22		0.2363	Private
Bath	54	2873	2033	4433	6466	67690	1477	2788	580	70478	2057	72535	11.218	474 7/16	129 8/16	603 15/16		1737.68	251.62	1000.31		0.4624	Private
Bedford	4	67	0	553	553	-	-	-	-	-	-	-	-	0	8	8		-	11.40	52.37		0.1153	Private
Botetourt	5	1164	0	3785	3785	-	-	42	5	42	5	47	.012	0	15 6/16	15 6/16		-	29.45	81.53		0.0293	Private
Greene	6	137	115	760	875	4633	-	762	-	5395	-	5395	6.166	21 2/16	11	32 2/16		76.05	-	109.35		0.2119	Private
Page	70	2491	945	12963	13930	33735	-	935	8705	34670	8705	43375	3.114	208 3/16	65 8/16	273 11/16		762.43	85.62	257.83		0.1004	Private
Rappahannock	13	666	1225	1770	2995	104552	35	2670	208	107222	243	107465	35.882	305 4/16	27 8/16	332 12/16		1092.02	-	298.89		0.0446	Private
Rockbridge	3	600	0	2672	2672	-	-	-	-	-	-	-	-	0	5 9/16	5 9/16		-	17.01	25.16		0.0156	Private
Rockingham	50	3260	5557	7426	12983	105725	50	1240	360	106965	410	107375	8.270	1090 1/16	171 4/16	1261 5/16		3998.61	681.22	613.40		0.4231	Public & Private
Warren	14	923	440	5483	5923	4180	-	-	965	4180	965	5145	.869	76 11/16	57 10/16	134 5/16		282.07	171.77	260.85		0.1207	Private
Total	239	14970	12768	48152	60920	334494	1627	9651	11248	344045	12875	356920	5.859 Av.	2353 4/16	633 1/16	2986 5/16	147 1/2	$8596.86	$1767.79	$3631.26	$1238.03	$174.23	$0.2550	
Second Eradication																							
Bath	1	20	20	0	20	125	2	0	0	125	2	127	6.350	1	0	1		$ 3.60		-		$0.1800	Private
Page	1	28	180	0	180	250	0	0	0	250	0	250	1.389	21 1/2	1	22 1/2		77.50		$ 5.00		0.4583	Private
Rockingham	2	300	384	0	384	4275	0	0	0	4275	0	4275	11.113	46 5/16	0	46 5/16		166.73		-		0.4341	Public & Private
Total	4	348	584		584	4650	2			4650	2	4650	7.996 Av.	68 13/16	1	69 13/16		$ 247.83		$ 5.00		$0.4329	
Grand Total	239	14970	13352	48152	61504	339044	1629	9651	11248	348695	12877	361572 Av.	5.879	2422 1/16	634 1/16	3056 2/16	147 1/2	$8844.69	$1767.79	$3636.26	$1238.03	$174.23	$0.2546	

TABLE 6. LOCAL CONTROL SUMMARY OF LOCAL CONTROL IN 1934 BY AGENCIES

Agencies	No. of Proj.	Planting Sites	Acres White Pine Pro.	Acres Worked			Ribes Pulled							Man Days Labor Used			Man Days Super-Vision	Costs						
				Crew	Scout	Total	Crew		Scout or Agent		Total		Total all Ribes	Ribes per Acre	Crew	Scout Agent Checker	Total		Labor	Supervision			Supplies and Equipment	Total Cost	Cost per Acre Worked
							Wild	Cult.	Wild	Cult.	Wild	Cult.								Scouts	District Agents	State Leaders			
E. C. W.	58	4	5153	8681.5	7361	16042.5	614723	-	31553	-	646276	-	646276	42.9	6311	1441	7752	99	$7945.70	$3686.94	-	-	-	$11632.64	$0.725
U. S. R. A.	239	-	14970	13352	48152	61504	339044	1629	9651	11248	348695	12877	361572	5.879	2422 1/16	634 1/16	3056 2/16	147 1/2	8844.69	1767.79	$3636.26	$1238.03	$174.23	15661.00	0.2546
Total	297	4	20123	22033.5	55513	77546.5	953767	1629	41204	11248	994971	12877	1007848	13	8733 1/16	2075 1/16	10808 2/16	246 1/2	$16790.39	$5454.73	$3636.26	$1238.03	$174.23	$27293.64	$0.3209

REPORT TO THE CHIEF FORESTER

on

WHITE PINE BLISTER RUST CONTROL

Shenandoah National Park

January 1- December 31, 1934

By

Edwin H. Francis, Assistant Forester

INDEX

White Pine Blister Rust Control

Shenandoah National Park

Virginia

History of White Pine Blister Rust in Shenandoah National Park

Until the fall of 1931 when L. M. Hodgkins and C. T. Geiser found the blister rust on some Ribes rotundifolium in Thornton Gap, no attention or study was particularly paid to the occurrence of white pine blister rust in the Blue Ridge range. From September 19th to September 24th 1932 Mr. Roy G. Pierce of the Department of Agriculture and Mr. C. R. Wiley of the Virginia Department of Agriculture made survey of the occurrence of white pine along the western face of the Blue Ridge Mountains from Front Royal to Luray. No blister rust on either the white pine or Ribes Rotundifolium was noted. The disease was however located on some cultivated currents growing in the L. J. Bryan's Nursery about two miles east of Luray on the Lee Highway.

On June 3, 1933 protection and survey of the most important stands of white pine occurring along the Skyline Drive between Thornton Gap and Big Meadows was started. During the summer several occurrences of white pine blister rust were located on both white pine and Ribes rotundifolium in the Hawksbill Mountain, Skyland Resort, and Sexton Shelter areas. In the spring and summer of 1934 further infections were found in the above areas and in the Black Rock area. Two trees in the above areas were so badly infected that they had to be cut down.

Recently other infected trees have been located; two young trees around 8 feet tall were yellowing and dying in Elk Wallow Gap, and several young pine (4-8ft. tall) were found infected and cankered in Tutwiler Hollow just outside Park. (See "Eradication and Infection Area Maps" and "White Pine Blister Rust Infection Area Chart").

Policy Used in Protecting White Pine in Park

The white pine areas warranting protection should have recreational and aesthetic value by virtue of location in close proximity to Skyline Drive, trails, proposed developments, secondary roads which will act as "feeders" to Skyline Drive and strategic points. The amount of white pine necessary for protection should depend upon its inherent value and its prominence in location. For ordinary pine areas and average of twnety trees per acre should be adhered to.

Preliminary Estimates and Survey for Eradication Program 1934.

A survey of the remaining white pine in the Central section was made in the early spring of 1934 and the following areas were decided upon as justifying protection from the white pine blister rust; Thornton Gap watershed, Hawks Bill extension area, Spitler's pine area (No. 85), and the Long Ridge areas(Nos. 80,82,85). These areas totaled 3142 acres of white pine and 8600 acres of protection acreage to be eradicated of Ribes rotundifolium. It was further estimated that 11,200 man-days of C.C.C. labor would be needed to complete the above work.

The survey and mapping of above white pine areas cost $117.25 of which $35.50 was for the assistant mapper at $1.00 per day.

A report on the occurrence of white pine in the southern section of the Park was made on May 29, 1934 in which certain areas were recommended for protection. (Of those recommended, only the Big Flat Mtn. area containing 10 acres of white pine was protected in 1934),(See Table No. 4).

Eradication Work For Season 1934

The eradication of gooseberry bushes (Ribes rotundifolium) started about May 15th and continued through October 19th, 1934. 6899 acres (field estimate) were eradicated of 579,669 Ribes bushes by the use of 6371 CCC man-days. (See Table Nos. 1,2,3,).

Eighty-three (83) acres were re-eradicated this year of 25,525 bushes with 82 man-days. (The large Ribes occurrence was due to one acre in Sexton Shelter on which about 10,000 second growth sprouts and seedling's occurred and to two acres of original eradication on Hawks Bill Mtn. which were included by an oversight with the re-eradication notes).

Recommendations For Re-eradication Spring 1935

Thornton Gap: Most of this area was eradicated by the crew-scout method. The area around Mary's Rock was eradicated by the crew method.

Only the immediate territory on each side of Thornton Gap and perhaps Mary's Rock will need scouting in the early spring of 1935.

Sexton Shelter: Re-eradication of about five acres was carried on. However more scouting on the western face of Sexton's Knoll picnic area below the horseback trail will be needed in the early spring of 1935.

Skyland Resort: Probably no work will be needed in this area next year.

Hawks Bill Mtn: Several areas eradicated late this fall will need checking over in early spring, in order to be sure that as full protection as possible is being given this area.

Black Rock: This area was eradicated during the summer of 1934. It was very difficult to get the crew to do clean work in this area; their chief trouble was leaving crowns in the ground which could not be detected until a month or so later.

It is recommended that the open fields west of Big Meadows be checked over by scout method in the early spring of 1935.

Big Flat Mtn: This area will not need attention for 2-3 years.

Cooperative Visits Made By Bureau of Entomology and Plant Quarantine

Mr. D. M. Fitzwater, Administrative Checker for the Bureau of Entomology and Plant Quarantine, visited the Park July 18-23, 1934 and aided materially in the official checking of various blister rust control projects.

Mr. Roy G. Pierce, Associate Pathologist of the Bureau of Entomology and Plant Quarantine, made an official inspection September 20-21, 1934. Many helpful recommendations were made at this time. More detailed information can be obtained from his report of September 27, 1934 which is as follows:

"As you know from personal observation and conversation, Mr. E. H. Francis and I spent two days last week, September 20th and 21st, inspecting the gooseberry elimination work going on in the Shenandoah Park area, You will be interested in learning some of the details and results of our inspection. I will list them by areas:

1. Spitlers Pine. 1½ miles south of Camp 2, west of Skyline Drive.

This area was inspected by Francis, Withers and myself on August 24th, as I informed you the same day, and found to have a considerable number of missed bushes in the upper portion of the area. Mr. Francis reworked this area prior to September 20th. On our present inspection, only one small area among the rocks was found with Ribes -- eight missed bushes being found in this rock drift. Mr. Francis will have this rock drift worked by one scout. No bushes were found at any other place in the area which indicates quite satisfactory work.

2. Bear Wallow Springs Area. About three miles south of Camp 2, along the Drive.

This area had a heavy Ribes population prior to working, particularly in an old pasture east of the road. We scouted parts of this area very carefully, but found no Ribes.

3. Black Rock Area.

A. We checked the work being done by Foreman Cave, both above and below the trail near Monkey Head. We found where numerous Ribes had been removed, most of them being hung up properly. However, four bushes just recently pulled were found lying on the ground, with leaves still green, and one of these bushes had numerous infected leaves. The foreman was cautioned concerning the necessity for careful disposal of the bushes. No living bushes were found which had not been pulled.

B. In the narrow neck between Monkey Head and Black Rock east of the bridle trail, we found numerous crown sprouts and a few missed bushes small in size along the trail. Original eradicative work had been done by Mr. Adams and found unsatisfactory. Mr. Francis plans to rework the area in the early spring of 1935 with scouts.

4. Lewis Spring Area.

This area was found by Messrs. Fitzwater and Francis to be poorly worked earlier in the summer. It was, therefore, reworked by Mr. Bailey. No bushes were found on the check by Mr. Francis or myself.

5. Thornton Gap Area

A. South of the Lee Highway and around Mary's Rock, west of Skyline Drive. Examination showed that many Ribes bushes had been pulled by the crew. The crowns were well hung up. We found, however, 10 missed bushes of medium height of the woods. The work on the area as a whole was good, but it is suggested that one man rework the area for missed bushes as soon as possible, due to its exposed situation in the gap.

East of Skyline Drive at Thorntons Gap.

B. The Ribes bushes had been numerous in this area, which had been worked by a crew. Six missed bushes were found on two acres in our check, two of these showing heavy grazing by cattle. This indicates possibly that there are other bushes present, which will "show up"

when the grazing ceases. It is suggested that one or two scouts rework the area early in the spring.

6. Skyland.

We found one eight-foot pine with many infected branches within 50 feet of the drive. All visible infections were removed. Only one leaf Ribes bush 30 inches in height was located. The area checked showed good work had been done by the crew.

7. Hawksbill - Spitler Hill.

A few Ribes bushes were found on the area checked and since the bushes in 1933 ran 1,000 to the acre here, very likely additional ones are present on the area. One small infected pine 15 feet in height was found with blister rust canker running into the trunk. The trunk canker will be carved out by Mr. Francis in order to save the tree. This area should be scouted in the spring of 1935.

8. Sexton Shelter.

This was worked in 1933. On one area of about an acre west of the Drive formerly in sumac and Ribes, where the bushes ran 5,000 to the acre, numerous Ribes seedlings were found 3 to 10 inches in height, together with a number of old bushes which had been mised. Other parts of the Sexton Shelter area were scouted, but the bushes found were only occasional. It was suggested that the portion where the Ribes were concentrated, be reworked at once, but where the bushes were few in number, that scouting for them be delayed until the early spring of 1935.

I believe that the system that Mr. Francis had inaugurated of having a checker, Mr. Campbell, check every eradication area, has worked out very well, because it has enabled the areas which were not satisfactorily worked to be found at once and this made it possible to rework them the same season."

Organization of Eradication Work 1934

The usual crew-strip method with five to six men in line with a crew leader following was used. In addition, this year an added position of checker was added to aid the foremen in charge of the project to keep check on the bushes missed by taking both formal (1/16 acre check plot) and informal checks immediately behind the crews.

Reports were sent in weekly on the "Weekly Report Form" to the Park Superintendents office by the various C.C.C. Project Superintendent. This system worked very effectively.

To assist the official checker (Assistent Forester) and an administrative checker (N.P.S. Foreman) with two assistants was introduced on August 1st in order to cope with the large amount of checking necessary on the various projects. This system of an administrative checker increased the efficiency of the crews immensely and aided the Assistant Forester in keeping a more thorough check over the entire blister rust eradication program.

Forms and Methods Developed To Aid Work. The "Weekly Report Form" was made to assist in coping with the large amount of statistical information required by the Bureau of Plant Desease Control which is cooperating in the white pine blister rust control in Shenandoah National Park. (See Exhibit A).

For the administrative checking, it was found advisable to keep the results in a cardboard covered notebook (3x5"). On the right side, the check plots with the pertinent data were listed and for each subsequent area, a small scale sketch-map of the particular section of the project being checked was made. On this map each check plot was located by number in the numerator and the number of bushes missed was placed in the denominator in red crayon.

Proposed Program 1935. It is proposed that a master control plan for the Shenandoah National Park be worked out with the data that is now available giving the estimated initial eradication cost for any further justifiable projects and the probable cost in man-days for maintenance for a five year program.

Sanitation Work. It is recommended that in the protected areas and in the proposed eradication areas for 1935 (probably Elk Wallow Gap, Hughes Hill, Beahm's Gap and Pass Mtn. will be proposed for eradication soon) that sanitation work be carried on in order to prevent as far as possible any spread of the blister rust.

Revision of Present Policy. Since a good many thrifty white pine stands just within the boundary of the Shenandoah National Park, occur, and since the State of Virginia has protected the best stands occurring just outside the Park boundary, it is recommended that the present policy be expanded to include some of the best of these white pine stands. In several cases these pine areas will cost very little to protect and will be an asset in future years to the Park.

White Pine Occurrence Mapping — About 10,000 acres of the Park land remain to be scouted for white pine. This areas to be scouted lies around Piney River in the north section of the Park and Marmon's River in the south section. It is hoped the field work can be completed during the first part of January.

Office maps showing the occurrence of white pine along with the coded classification have been finished for the south section. The central section needs a few revisions, and the north section remains still to be finished - When completed these maps (made on U.S.G.S. Advanced Sheets, scale 1/24000) will be bound into an atlas along with the narrative notes.

WHITE PINE BLISTER RUST CONTROL

Shenandoah National Park

January 1 - December 31, 1934

PHOTOGRAPHS

of

Typical White Pine Areas, Thrifty White Pine Growth,

Eradication Crews At Work In Season 1934,

Administrative Checking Crew At Work,

And White Pine Growing Southeast

Of Hawksbill Mtn.

****

A white pine stand on top Hawks Bill Mtn. covered with frost and snow. Initial steps have been taken this year to protect this stand.

White pine enlivening with added interest the main horseback trail going north between Hawks Bill Head and Naked Top. Same protection area as P82b.

Eradication crew No. 1 from S.N.F. Camp No.2 at work on the Hawksbill extension area for 1934. The crew organization can be seen with the lineman on the left following the string laid down during the last run and the string man on right laying the string during this run; crew leader following in rear of crew; and the foreman in charge scouting around "sizing up the job".

Eradication crew No. 2 from S.N.F No. 2 also at work on the Hawksbill extension area. shows wide use of the Ribeo Hooks made use of in this year's eradication work.

Ribes bushes pulled and left dying in Hawksbill extension area. Previous to eradication the above area was one of the worst possible danger zones for open spread of the blister rust.

A CCC foreman pointing out the Ribes bushes that were pulled and hung up in other bushes near by to dry. Same area as above.

Young second growth white pine as it very often occurs on the south and southwestern slopes of Haywood Mtn. (part of Hawks Bill Mtn.) This white pine is not protected but should be included soon.

The administrative checking crew at work. This was put into effect about Aug. 1st to assist in checking the efficiency of the eradication crews and proved very helpful in keeping the crews on their toes for "missed" bushes.

White pine occurring on south side of Black Rock Mountain as soon in winter from Skyline Drive just south of the Rapidan road. This is a residual stand of white pine as this area was logged over about four years ago. This area was included for the first time in the eradication program for protection from the white pine blister rust.

White pine capping a slight rise just north of the gray birch swamp in the Big Meadows and Black Rock area.

A typical young thrifty white pine about five years old showing a 30 inch increase in height during last two years (1932 - 33).

Typical second growth white pine. In this age pine, the white pine weevil damages is especially noticed.

TABLE #1 - RESULTS OF PREERADICATION SURVEY
WHITE PINE AREAS - 1934 - U. S. N. Form

Camp	County	Name of Forest, Park or State Work	Number of Projects	Acres White Pine to be Protected	ACRES TO WORK: Crew	Scout	Total	Estimated Man Days of Work Required: Crew	Scout	Total	Man Days Used: Asst.	Supervisor	Total	COSTS: Asst.	Supervisor	State	Total	Percent of Preeradication completed 10/1/34
Va. P60 & 74	Green	Virginia State	8	187	110	1195	1305	55	5	60	8	9	9	$0.00	$ 72.50	$0.00	$ 72.50	90%
" P74	Madison	" "	16	638	0	3490	3490	0	1	1	0	17	17	$0.00	160.15	0.00	160.15	90%
" P68 & 74	Page	" "	70	1644	650	10440	11090	260	60	320	47	62	109	75.20	503.15	0.00	578.35	90%
" P68	Rappahannock	" "	32	932	1165	4540	5705	360	10	370	23	20	43	33.60	215.00	0.00	248.60	80%
" P74	Rockingham		5	101	335	500	835	100	5	105	5	3	3	0.00	19.50	0.00	19.50	15%
			131	3502	2260	20165	22425	815	81	896	83	113	181	108.80	970.30	-	1079.10	-
PCC # 1-2-3-4	Shenandoah National Park		8	3142	4608	4603	8671	2608	3600	31800	35½	87	91	$35.50	$81.75	-	117.25	100%
F-5-Va. -	Preeradication Work Completed During 1933 Season Figures Not available																	
F-6- Va.-	Wythe, Unaka National Forest		2	185	-	320	320		16	16	2	1	3	$2.00	$14.40		16.40	100%
" -	Smyth " " "		4	145	-	405	405		16	16	0	5	5	-	24.00		24.00	100%
F-7-Va. -	" " " "		1	125	-	550	550		8	8	0	0.5	0.5	-	2.40		2.40	100%
" -	Washington " " "		5	185	25.3	100	125.3	70	16	86	8	2	4	2.00	19.20		21.20	100%
			12	640	25.3	1375	1400.3	70	56	126	10	38.5	16.5	$4.00	$60.00		$64.00	100%
TOTALS			151	7284	6893.3	25603	32496.3	6485	5739	13224	107½	186	292.5	$148.30	$1112.05	-	$1260.35	-

* Taken from 1934 White Pine Blister Rust Report of
J. G. Luce, State Leader for Virginia.

* [illegible] Aug. 1, 1934. A. C. L.

No. of Camps	Forest, Park or State and County Worked	No. of Projects	No. of Planting Sites	Acres of White Pine: Protected	Acres Worked: Scout: Crew	Acres Worked: Scout: Agent	Acres Worked: Total	Miles Trailed: Scout: Crew	Miles Trailed: Scout: Agent	Miles Trailed: Total	Miles Trailed: Per Acre	Man Days Labor: Foreman	Man Days Labor: Crew	Man Days Labor: Total	Man Days Labor: Checker other than field	Costs: Supervision: Labor	Costs: Supervision: Checker	Costs: Total	Total Cost: Per Acre Worked	Ownership
First Eradication																				
Va. F-60	State Albemarle	6	0	240	400	700	1100	8360	1280	9660	[illegible]	[illegible]	[illegible]	140	4	105.00	347.59	452.59	.41	Private
Va. F-60	State Green	5	0	109	205	640	845	5255	110	5365	[illegible]	[illegible]	[illegible]	121	2	98.00	248.05	346.05	.41	Private
Va. F-5	Forest Unalm	6	0	487	-	595	595	-	270	270	[illegible]	[illegible]	[illegible]	46	3	46.00	67.20	113.20	.19	Public
Va. F-6	Forest Unalm	10	1	370	-	610	610	-	459	459	[illegible]	[illegible]	[illegible]	47	6	47.00	72.00	119.00	.20	Public
Va. F-7	Forest Unalm	6	0	310	23.3	1000	1023.3	5130	1615	6745	[illegible]	[illegible]	[illegible]	175	5	175.00	168.00	343.00	.33	Public
CCC 2	George Washington	5	1	319	649	685	1334	4368	34	5002	3.7	77	6.2	183.2	2.4	179.40	75.74	255.14	.19	Federal
CCC 1-2-3-4	Shenandoah Nat'l. Park	5	0	2309	5870	1296	6866	552425	27274	579699	84.5	49	1155	6464	70	6735.30	2491.78	9227.08	1.34	Federal
Total First Eradication		46	2	4144	6847.3	5526	12373.3	576153	31042	607195	45.7	9	1417.2	7176.2	92.4	$7385.70	$3470.36	$10856.06	$ .877 Av.	
Second Eradication																				
Va. F-7	Forest	1	0	10	0	5	5	0	29	29	5.8	0	3	3	0	$ 1.00	$ 6.80	$ 7.80	$ 1.56	Federal
CCC 2	Forest	9	2	861	1754	1827	3581	13432	90	13582	3.8	109	18.8	495.8	6.6	486.00	204.78	690.78	.19	Federal
CCC 3	S. N. F.	2	0	138	80.2	3	83	25133	392	25525	307.5	73	4	77	-	73.00	5.00	78.00	.94	Federal
Total Second Eradication		12	2	1009	1834.2	1835	3669.2	38565	511	39076	10.7	[illegible]	25.8	575.8	6.6	$ 560.00	$ 216.58	776.58	$ .21 Av.	
Grand Total		58	4	5153	8681.5	7361	16042.5	614723	31553	646276	42.9	[illegible]	1443	7752	99	$7945.70	$3686.94	$11637.64	$ .725 Av.	

* Taken from 1934 White Pine Blister Rust Report of J. G. Luce, State Leader for Virginia.

* Taken from 1954 White Line Blaster Rust Report of S. C. Insc. State Leader for Virginia.

TABLE # 3 - SUMMARY OF WEEKLY RECORD SHEETS BY AREAS
SHENANDOAH NATIONAL PARK
May - October 1934

FIELD AREA	Scouts: Number Scouts	Scouts: Acres Cleared	Scouts: Ribes Pulled	Crews: Number Crew Men	Crews: Acres Cleared	Crews: Ribes Pulled	Checker Plots: Number Checkers	Checker Plots: Plots Made	Checker Plots: Bushes Found	Informal Checks By Foremen	Crew Checks: Number Bushes	Crew Checks: Acres Checked
1 Black Rock	17	56	1948	2180	1974	233537	249	296	723	5868	28358	757½
2 Thornton Gap	255	958	3916	1179	1797	50849	129	10	22	2278	1323	73
3 Hawksbill Mtn.	11	15¼	546	815	850½	130825	138	470	825	3112	1989	217 5/8
4 Bear Wallow Springs	25	91	2282	468	326	42533	38	76	117	468	377	260
5 Flat Top Mt.					163	4380						
6 Area # 85	8	14	184	70	117	14456	14	39	71	526	1164	164
7 Area # 80 - 82	4	8	120	211	216	29972	24	53	56	476	707	190
8 Area # 81	132	154	1648	168	126	11281	18	30	10	176	674	57
Total Initial Eradication	452	1296¼	10644	5309	5569½	517833	610	974	1826	12904	34592	1719 1/8
1 Hawksbill				56	77	13939	5		17	80		
2 Skyline Shelter	4	2 3/5	392	17	3.2	11194						
Total Reeradication	4	2 3/5	392	73	30.2	25133	5		17	80		
Administrative Checker								554	1317	563		
Total	456	1299 1/10	11036	5382	5600	542966	615	1528	3160	13547	34592	1719 1/8
Bushes pulled by Scouts and Crews			3133 13467			34592						
Grand Total	456	1299 1/10	27636	5382	5600	577558	615	1528	3160	13547	34592	1719 1/8

TABLE 5 - RESULTS OF PRE-ERADICATION SURVEY
WHITE PINE AREAS, 1934 N.C.C. TOUR
SHENANDOAH NATIONAL PARK

Name of Project	Name of Camps Working On Project	Acres of White Pine To be Protected	Acres to Work: Crew	Acres to Work: Scout	Acres to Work: Total	Estimated Man Days Work Required: Crew	Estimated Man Days Work Required: Scout	Estimated Man Days Work Required: Total	Man Days Used: Asst.	Man Days Used: Lopper	Man Days Used: Total	Costs: Asst.	Costs: Lopper	Costs: Total
Thornton Gap Pine Area	S.N.P. # 1	1826	2814	2519	5333		2800	2800	17	17	34	17.00	51.00	68.00
Hawksbill Pine Area	(S.N.P. # 2 (S.N.P. # 1	363	585		585	5600		5600	2	2	4	2.00	6.00	8.00
Black Rock Area	S.N.P. # 2	600	1206		1206				4	4	8	4.00	12.00	16.00
Bear Wallow Springs	S.N.P. # 3	315							2½	1½	4	2.50	4.50	7.00
Spitler's # 85	S.N.P. # 3	5							1		1	1.00		1.00
# 80 & 82	S.N.P. # 3	25					2800	2800	2	½	2½	2.00	1.50	3.50
# 81	S.N.P. # 3	6							1	½	1½	1.00	.75	1.75
Big Flat Mtn. Area.	S.N.P. # 5								6	2	8	6.00	6.00	12.00
	Shenandoah	3142	4608	63	8671	5600	5600	11200	35½	27½	63	35.50	81.75	117.25

Note: The cost of CCC man day was figured at $1.00

White Pine Blister Rust Infection Area Chart

SHENANDOAH NATIONAL PARK
VIRGINIA

Name of area	Do White Pine or Ribes or both occur	Extent of Infection	Damage Observed	Elevation	By Whom found	Date of discovery	Location (County, Mtn. etc.)	Age of disease
Black Rock (Central section)	R. rotundifolium	Not known	Local area	3660	W.G.Pierce	Sept. 20, 1934	Head Mtn. Rockingham Co.	Summer 1934
	P. strobus	Not very large	One tree badly infected.	3500	L.M.Francis	May 15,1934	Black Oak Swamp Madison Co.	4 years
Hawksbill Mountain	R.rotundifolium	Hawksbill and Skyland Mountain	(Scattered areas and V.V. done	3500	W.G. Pierce	Aug.15,1934	Skyland Mountain Madison Co.	Summer 1933
	P. strobus	Infection found in vicinity of Skyline Drive between above	One tree dead. Several trees with cankers.	3000	L.M.Francis	Aug.3,1933	Hawksbill Mtn. Madison Co.	7 years (?)
Skyland	P. strobus	Probably small	One tree 6-8 years old in-	3600	W.G.Pierce	Sept.20,1934	Page County	(?)
Panton Shelter	R.rotundifolium	Small as far as could be ascertained	fected. Infection area	3200	W.G.Pierce	1933	Madison Co.	Summer
Thornton Gap	R.rotundifolium	Small local area	Small	2400	W.G.Pierce	1931	Madison Co.	1931
Butler Hollow	P. strobus	Several young P.Pine in open field were infected.	Original, later all main trunks girdled	1500	L.M.Francis	Nov.1934	Butler Hollow, Page Co.	3 - 4 yrs. (?)
Hawksbill Gap	P. strobus	Not known	Five P.Pine(5ft) were yellow &	2500	L.M.Francis	Dec.4, 1934	Hawksbill Gap, Page & Rappahannock Cos.	5 - 7 yrs. (?)

C T Cross

NATIONAL PARK SERVICE
Branch of Forestry
White Pine Blister Rust Control

Exhibit A

Weekly Record Sheet

Week Ending _____ 19___ ECW Camp No. _____

		Mon	Tues	Wed	Thurs	Fri	Sat	Total
rea leared r couts	Location _____ Area No. _____							
	No. Scouts							
	Approx. acreage cleared							
	No. ribes pulled							
eage ad. by ews	Location _____ Area No. _____							
	*No. men in crews							
	Approx. acreage cleared							
	No. ribes pulled							
heck Lots	No. checkers used							
	No. plots taken							
	Size each plot							
	No. ribes found							
	Average height of ribes							
	Maximum & minimum height							
	Evident chief cause for missing ribes							
	No. ribes pulled informally behind crews							
Crew Checks	No. ribes pulled							
	Approx. acreage checked							

*Includes crew leaders but not scouts or checkers.

Signed _____
Foreman in Charge

Note:
Scouts are those men designated to eradicate an area with light ribes density not warranting crew eradication.
Crew Work - Means eradication by men in line with crew leaders.
Check Plots - Refers only to work done by checkers.
Crew Checks - Refers to those times when the eradication crew is turned back to check.

White Pine Blister Rust Control

The Eradication and Infection Areas

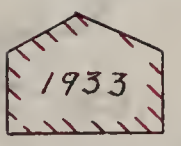
in the

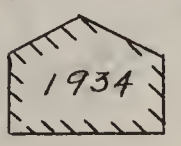
SHENANDOAH NATIONAL PARK

Virginia

****

LEGEND

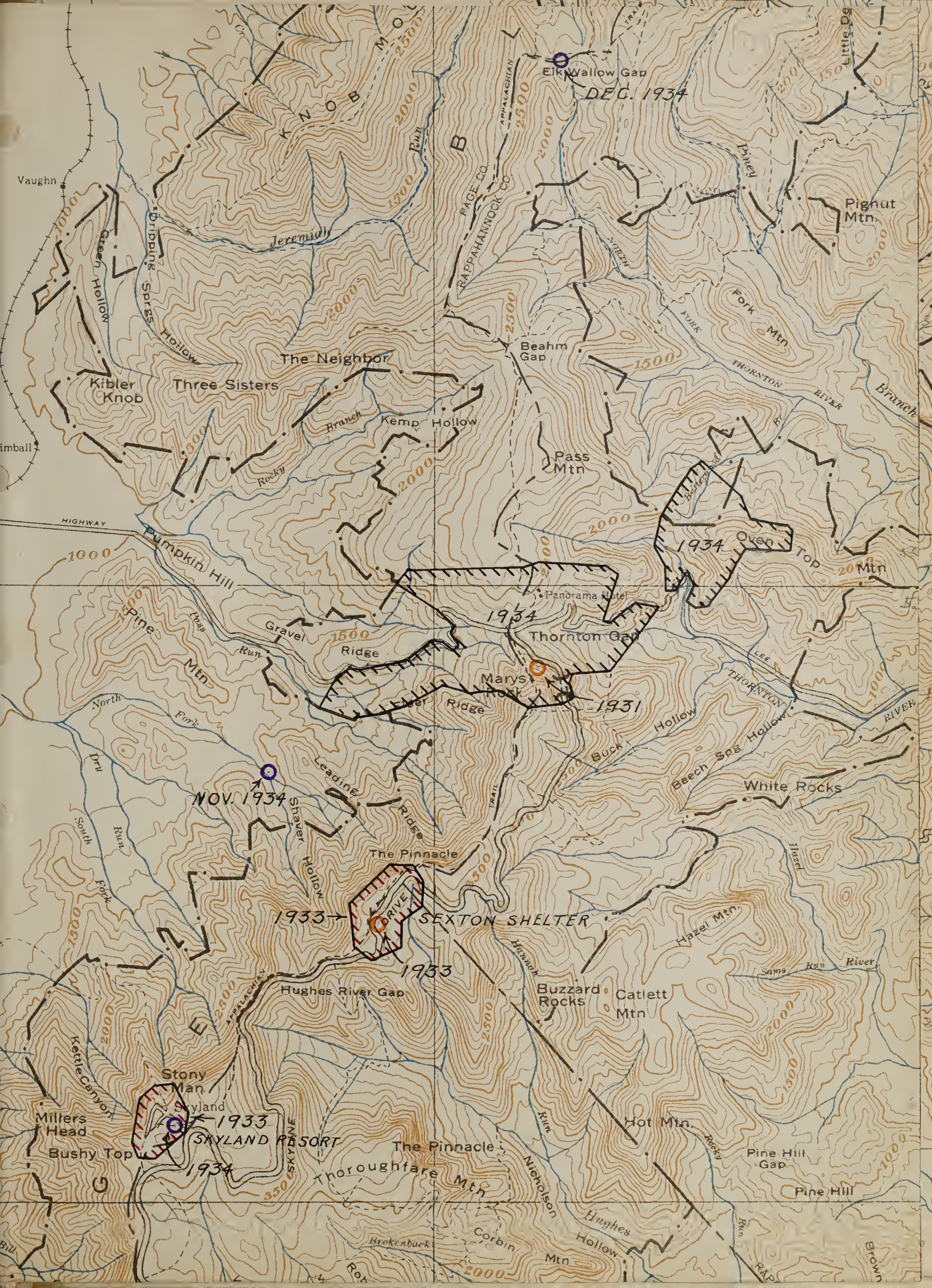
Ribes Eradication in 1933 --- 

Ribes Eradication in 1934 --- 

White Pine Blister Rust Infection Areas:

Ribes Rotundifolium -------- O

Pinus Strobus ------------ O



Elk Wallow Gap
DEC. 1934
KNOB
Vaughn
Jeremiah
Dripping Sprgs Hollow
Green Hollow
Piney
Pignut Mtn.
PAGE CO.
RAPPAHANNOCK CO.
APPALACHIAN
Fork Mtn
NORTH FORK THORNTON RIVER
Branch
Beahm Gap
The Neighbor
Kibler Knob
Three Sisters
Kemp Hollow
Rocky Branch
Pass Mtn
HIGHWAY
Pumpkin Hill
1934
Oven Top Mtn
Panorama Hotel
1934
Thornton Gap
Pine Mtn
Pass Run
Gravel Ridge
Marys Rock
1931
Ridge
Buck Hollow
LEE
THORNTON RIVER
Beech Spg Hollow
White Rocks
North Fork
Dry Run
South Fork
NOV. 1934
Leading Ridge
Shaver Hollow
The Pinnacle
1933
DRIVE
SEXTON SHELTER
1933
Hazel Mtn.
Sams Run River
Hughes River Gap
Buzzard Rocks
Catlett Mtn
Kettle Canyon
Stony Man
Skyland
1933
Millers Head
SKYLAND RESORT
Bushy Top
1934
SKYLINE
The Pinnacle
Thoroughfare Mtn
Nicholson Hollow
Hot Mtn.
Pine Hill Gap
Pine Hill
Hughes
Corbin Mtn
Brokenback
TRAIL

Turkeypen Gap
Tanbark Flat
Naked Top
Hawks Bill Gap
Hawks Bill
1934
1933
Roundhead Mtn.
Bailey Mtn.
Franklin Cliffs
Fishers Gap
Lucas Gap
TANNER RIDGE
Black Rock
PAGE CO.
MADISON CO.
Park Hollow
Lewis Spring
Chapman Mtn.
Stony Mtn.
Milam Gap
Broyles Gap
RAPIDAN CAMP
Doubletop Mtn.
Long Ridge
Hazel Top
The Laurels
The Sag
Laurel Gap
Cat Knob
Rowel Mtn
Bootens Gap
Peters Point
Bush Mtn.
Bear Fence Mtn.
Cliff Mtn.
BEAR WALLOW SPRINGS
Lewis Mountain
Pine Mtn.
ROCKINGHAM CO.
Buzzard Rocks
Pocosin Hollow
Bald Faced Bluff
Icy Bluff Mtn.
Fork Mtn
Chapman Mtn.
Bear Church Rock
Jones Mountain
Bluff Mtn.
Ridge

W E S T V I R G I N I A

ANNUAL REPORT

OF

WHITE PINE BLISTER RUST CONTROL ACTIVITIES

IN

WEST VIRGINIA

1934

(COPY)

Amendment No. 2
Washington, D. C.

AMENDMENT TO
MEMORANDUM OF UNDERSTANDING
Effective July 1, 1932
Between

THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, THE WEST VIRGINIA CONSERVATION COMMISSION, AND THE WEST VIRGINIA DEPARTMENT OF AGRICULTURE

Cooperative Work in Controlling White Pine Blister Rust in West Virginia.

==========

The undersigned mutually agree that the memorandum of understanding between the United States Department of Agriculture, Bureau of Plant Industry, the West Virginia Conservation Commission, and the West Virginia Department of Agriculture effective July 1, 1932, to continue in effect until June 30, 1933, shall be continued in full force and effect in all its provisions for the two year period ending June 30, 1935, with the exception of paragraphs D-2 and D-6 which shall be amended to read as follows:

D-2. That this memorandum of understanding shall take effect July 1, 1933, and continue in effect until June 30, 1935, provided that either party may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

D-6. That for the two-year period, July 1, 1933 to June 30, 1935, the West Virginia Conservation Commission and its cooperators will expend about $700.00 and the Federal Government in behalf of the United States Bureau of Plant Industry, about $18,000.00 in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed $20,000.

Apr. 6, 1934 — H. W. SHAWHAN
Chief Forester, West Virginia Conservation Commission.

Apr. 6, 1934 — J. B. McLAUGHLIN
Commissioner, West Virginia Department of Agriculture.

Apr. 16 - 34 — K. F. KELLERMAN
Acting Chief, Bureau of Plant Industry, U. S. Department of Agriculture.

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ANNUAL REPORT OF WHITE PINE BLISTER RUST CONTROL ACTIVITIES IN WEST VIRGINIA 1934

Foreword

White pine blister rust control work in West Virginia conducted under a co-operative agreement between the U.S. Dept. of Agriculture, on the one hand, and the W.Va. Conservation Commission and the state Department of Agriculture on the other, and by the authority to destroy plant pests vested in the Commissioner of Agriculture by article 12, chapter 19 of the West Virginia code. In this agreement the Conservation Commission undertakes the administrative supervision, and the state Department of Agriculture assumes the responsibility for the enforcement of the state laws.

Personnel

Since July 1, 1934, blister rust control work conducted throughout the United States by the United States Dept. of Agriculture forms one of the projects administered by the Division of Plant Disease Control, Bureau of Entomology and Plant Quarantine. The nation as a whole is divided into a number of regions each with a supervisor. West Virginia is one of the states included in the Southern Appalachian division under Regional Supervisor Roy G.Pierce with headquarters at Washington, D. C.

The regular personnel in West Virginia consists of a state leader, J. M. Ashcroft, whose headquarters is at Marlinton, three district agents with headquarters at Marlinton, Beckley, and Franklin, and a checker for each of the National Forests : Monongahela and Geo.Washington. This force is increased when expediency requires it by the addition of temporary field agents who act as assistants to the district agents in scouting or supervision of eradication.

The supervisory staff during the field season of 1934 consisted of the following:

1	State Leader-----	Bur.of Entomology & Plant Quarantine
3	District agents--	" " " " " "
2	B.R.Checkers-----	U.S.Forest Service
1	" " " (part time)	Bur.of Entomology & Plt.Quarantine
4	Field agents	" " " " " "

Labor used was as follows:

1. Civilian Conservation Corps.

2. Local labor obtained through the National Re-employment Service and paid from F.E.R.A. funds.

White Pine

The exact acreage of white pine producing land in West Virginia is unknown. It is also impossible to give any exact figures for any particular county, in as much as no county has been completely surveyed. Furthermore, the acreage will vary with the standards used in classification of pine land; so that in general the lower the standard the greater would be the acreage disclosed by a survey. Nevertheless, some idea of the amount of pine land is desirable.

The latest estimates for the whole state are those of J.A. Cope, made in August 1930. These estimates by county are given below:

County	Acres in White Pine 5% or better
Grant	2,000
Greenbrier	4,000
Hardy	1,000
Mercer	12,000
Monroe	2,000
Pendleton	80,000
Pocahontas	25,000
Raleigh	20,000
Summers	3,000
Total	149,000

The pre-eradication and eradication work done in 1934 and reported below give us a basis for a new and more accurate estimate of the pine acreage in Pocahontas County. In this work with about 2/3 of the pine area of the county covered, 5012 acres of pine land have been located.

A comparison of these figures with those of Cope would indicate that the latters figure for Pocahontas county (25,000 A.) is excessive. But it should be pointed out that the standard of classification of pine land was not the same in both cases. Whereas Cope used as his standard, land on which 5% or better of the dominant trees were white pine, in the later survey the minimum was stands of 10 acres

or more with the following requirement in regard to density of white pine:

Under 6 ft. in height	100 trees per acre
" 6-20 ft. in height	80 " " "
" 21-40 ft. " "	50 " " "
41 ft. or over " "	35 " " "

These minimums are not to be construed as meaning that all stands included in the 1934 survey covered a minimum of 10 acres; but rather that 1000 trees of the first class, 800 of the second, 500 of the third, and 350 of the fourth, were distributed over an acreage sufficient to insure as many reaching maturity as if they had been distributed over 10 acres. Obviously other things being equal, 500 trees are quite as likely to reach maturity on 5 acres as on 10. However, 500 trees are not as likely to reach maturity on 1 acre as on 5, because of overcrowding. Hence in the 1934 survey, stands of white pine with too few trees or with too small an acreage were not included as pine land. On the contrary, Cope included all acreage of 5% or better no matter how small.

This difference in standard necessarily affect the results; but how much is a matter for conjecture. However, there is obviously a much larger acreage of potentially pine land than the 1934 survey would indicate, and in this one county at least Cope's figures may not be far wrong if one considers the basis he used in his estimates.

Between 1899 and 1926, a period of 27 years, 305,692,000 ft. of white pine were cut in West Virginia. If we estimate that this timber was cut on land averaging about 25% white pine, and scaled on an average of 2500 ft. per acre, 122,692 acres would be required to grow the white pine lumber produced in West Virginia during the years mentioned above. Furthermore, 27 years are probably too short a time for a second crop to be cut off any of this land. These figures although rather crude, indicate a much larger acreage originally than the results of the 1934 survey show, and coincide rather closely with Cope's estimate (149,000) for the whole state.

White Pine Lumber Production in West Virginia

The following table shows the white pine lumber production in West Virginia between 1899 and 1933, both years inclusive.

White Pine Lumber Production in West Virginia *

Year	Amount in M ft. B.M.)	Year	Amount in M ft. B.M.
1899	4,940	1917	8,461
1900	?	1918	2,901
1901	?	1919	2,832
1902	?	1920	6,163
1903	?	1921	2,938
1904	9,130	1922	2,525
1905	31,450	1923	3,205
1906	31,322	1924	2,641
1907	29,651	1925	3,970
1908	22,548	1926	3,446
1909	25,986	1927	3,767
1910	21,147	1928	1,399
1911	23,552	1929	2,673
1912	19,740	1930	4,297
1913	10,675	1931	1,375
1914	10,991	1932	1,792
1915	13,858	1933	632
1916	11,619		

* Figures in this table were obtained from:

Bulletins of Bureau of Census, "Forest Products: Lumber, Lath, and Shingles."

U.S.D.A.Statistical Bull. No. 21.

Nurseries growing white pine nursery stock

The following table shows the nurseries engaged in the growing of white pine nursery stock and the number of trees each had growing at the end of 1934.

Name	Species	Number
John Dieckman & Sons Elm Grove, W. Va.	Pinus strobus	300
Rose Hill Nursery Annamoriah, W. Va.	" "	15
Wells, Herbert F.	" "	1000
Conley State Forest Nursery, Lesage, W. Va.	" "	20000
Mt. State Forestry & Nursery Co. Gladwyn, W. Va.	" "	10000
U.S.Forest Service Nursery, Parsons, W. Va.	" "	831,000

The above figures were furnished by F.W.Craig, Assistant State Entomologist.

Stand in saw timber and cord wood

At the present time, according to U.S.Forest Service statistics, there is something upward of 22 million ft. of white pine saw timber and 177,000 cords of white pine on cordwood areas valued at $460,670.00. The federally-owned stumpage is estimated at 15,730,000 ft. of sawtimber with a value of $47,150.00.

West Virginia Department of Agriculture bulletin 74 lists the following uses for white pine;

Boxes and crates
Caskets and coffins
Furniture
Patterns & flasks
Ship and boat building
Vehicles
Car construction
Fixtures
Machine construction
Planing mill products
Tanks
Woodenware

U.S.Forest Service statistics show that in 1924, although W. Va. exported over 6 times as much hardwood as it imported, it imported twice as much soft wood as it exported. Furthermore the total softwood production of W. Va. (89,311,000) was insufficient to supply the demand (189,670,000 ft.) for this type of lumber.

Ribes

Cultivated gooseberries and currants are quite generally distributed throughout the eastern, southern and northern counties of the state. For the most part, however, they present no problem in as much as the white pine of the state is confined principally to five counties: Greenbrier, Mercer, Pendleton, Pocahontas and Raleigh with smaller acreages in Hardy, Monroe and Summers.

The species present in the greatest abundance in Pocahontas, Greenbrier and Raleigh Counties where by far the larger part of the eradication work of 1934 was conducted was Ribes vulgare. The other cultivated species in the order of number are as follows: Ribes nigrum, R. americanum, and R. odoratum. Of these R. Americanum seeme to be the species most highly valued by the owners, and the one for the destruction of which permission is most reluctantly given. R. nigrum is not a valued species. It seems to have been introduced by the earlier settlers. Whatever value attached to this species originally however has been lost. Permission to eradicate it is very readily obtained from the present owners. R. odoratum was found in only three locations, and all plants were destroyed.

On the whole little trouble was had in obtaining permission to destroy cultivated bushes.

In Pendleton and Hardy counties, the other counties in which eradication work was done, no cultivated bushes were found in the former and only 18 in the latter.

The wild species found in West Virginia are Ribes cynosbati L., R. rotundifolium Mich., and R.glandulosum Grauer. The last species grows apparently only at very high altitudes (3500-4800 ft) and at the present writing has not been found in the proximity of pine of commercial value.

Ribes cynosbati and R. rotundifolium are found quite generally distributed throughout the more mountainous parts of the state. Unfortunately, the best pine areas in the state are located in the regions in whichthese two species seem to be most abundant. In Pendleton County by far the greater part of the pine is found in coves on the rather flat tops of the larger mountain ranges, this is in general the most favorable habitat for the Ribes in that county. The probable explanation for this is that the larger, broader valleys such as the valley of the South Branch of the Potomac River is at an elevation which approaches the lower limit of the Ribes in that latitude. The rather poor soil of the Potomac River Valley slopes may also be a somewhat limiting factor.

In Greenbrier and Pocahontas counties the best stands of pine are found in the valleys and coves. This is also the most favored habitat of Ribes. The slopes of the valleys and mountain tops are for the most part densely covered with vegetation in competition with which Ribes are at a disadvantage. In the valleys and coves, a combination of soil, and light conditions are found which are more favorable for the Ribes. These coves are usually damp and boulder strewn, a substratum favorable for Ribes. Breaks in the overhead canopy, caused by stream beds, trails and paths allow sufficient light for growth. The zone between the dense wood and cultivated fields usually along a fence is a prolific producer of Ribes. In this zone the limiting factors of neither tillage nor shading operate. Consequently, where soil conditions are favorable in these areas, an abundance of Ribes may be expected.

In Greenbrier County the best pine is found in places similar to those most productive of pine in Pocahontas County; but Ribes are comparatively scarce. However, a somewhat different soil condition obtains in the former county. The pine is confined for the most part to Anthony Creek valley, the soil of which is predominantly shale. That this may be the reason for the scarcity of Ribes in Anthony Creek valley is borne out by the fact that very few Ribes were found on the west slope of Browns Creek valley in Pocahontas County where similar soil conditions obtain. This fact is the more striking in as much as the east slope of Browns Creek valley, which has a limestone subsoil, was a most prolific producer of Ribes.

In Raleigh county, the most favorable habitat for Ribes are similar to those most favorable in Pocahontas county. However, the pine is not so definitely localized. A large part of the pine area of this county is located on high flat table land, and the pine is not so definitely confined to coves and valleys. The growth of Ribes therefore does not coincide to any marked degree with that of pine. Consequently, many stands of pine are found entirely free of Ribes.

Of all types of substratum, Ribes appear to thrive best in and around rocks. This is true of almost all kinds of rocks found in this state, but it is especially fruitful on soil underlain by limestone. These facts together with the fact that Ribes almost never occur in the same habitat as Rhododendron would seem to indicate a preference for alkaline soils: for calcium carbonate is a large constituent of almost all sedimentary rocks, forming the cementing matrix.

White Pine Blister Rust

What It Is

Blister rust is disease of the five needle pines caused by a parasitic fungus, Cronartium ribicola Fischer, which belongs to the group of fungi known as the rusts. The fungus cannot pass directly from diseased to healthy pine, but must first pass through a stage in its life cycle during which it is parasitic on the leaves of Ribes plants of practically any species. The removal of such Ribes plants from the proximity of white pine is effective, therefore, in the control of the disease on pine.

Brief History

Blister rust was first found in West Virginia on Ribes leaves near Alpena, Randolph County, and near Thomas in Tucker County in 1931. Since that time the Ribes stage has been found near Dunmore in Pocahontas County and in Pendleton County near Fort Seybert.

Until the present year the disease had never been encountered in the state on pine. In July of this year, however, the first pine infections in West Virginia were observed. These infections, 21 in number, were found on Rough Run near Ft. Seybert, Pendleton County, in the George Washington National Forest by Mr. W.J.Cullen, B.R.checker, for the Forest. Because of lack of

sporulation specimens were forwarded to Dr. H. Metcalf at Yale University for verification. Dr. Metcalf reported that the infections were due to the white pine blister rust, and that lack of sporulation was probably due to an invasion of the infected area by a secondary organism.

Control Work in West Virginia prior to 1934

The first control work undertaken in West Virginia was done at the Forest Serviee nursery at Parsons. This nursery sanitation was first started in 1928. Since that time the nursery has been worked at least once each year up to and including 1934.

In 1933 the control work was extended to include a cleanup of the state-owned Seneca State Forest and Watoga State Park, the combined area of which approximates 15,000 acres. Only a small percentage of this land however is pine bearing.

Blister Rust Control in 1934

Spread of Rust

The discovery of the rust on pine and Ribes in Pendleton County in 1934 is the only extension of the known range of the disease in West Virginia, and the first discovered case of its occurrence on pine within the state. This increases the number of counties in which the disease has been found on Ribes to four and on pine one.

Pine Location and Pre-eradication Survey.

After the close of the regular eradication season the appointments of two temporary agents were extended to the end of the year. These men were kept to assist the state leader and district agents in a pre-eradication survey of the pine. The objects of this survey was to locate and map as much of the commercially valuable pine as time would permit in preparation for the eradication season of 1935, and to estimate the man days of labor required for the protection of the pine located. The results of the survey are given in the tables onthe following page.

Table 1. Showing Results of Preeradication Survey* of Pine Areas on National Forests and National Parks from E.C.W.camps, 1934.

Name of National Forest or Park	Acres pine to protect	Acres to be worked	Estimated man-days labor	Percent survey completed
Monongahela National Forest	1509	10,563	2,343	25

* It is understood that this preeradication work is only for the dormant season before and after the regular eradication season.

Table 2. Showing Results of Preeradication Survey of Pine Areas done by NIRA men outside of State and Federal Camps in 1934.

County	Acres pine to protect	Acres to be worked	Estimated man-days labor
Pocahontas	1926	6679	259
Greenbrier	1265	8807	240
Pendleton	841	6225	250
Total	4032	21711	749

Table 3. Showing Results of Preeradication Survey Work done by all Agencies in 1934.

Agency	Acres pine to protect	Acres to be worked	Estimated man-days labor
E.C.W.	1509	10563	2343
N.R.A.	4052	21711	749
Total	5561	32274	3092

Local Control

Summaries of the control work and cost thereof are given in the following tables by program.

TABLE 4 LOCAL CONTROL - RESULTS OF RIBES ERADICATION 1934 E.C.W.

No. of Camps	Forest or Park and Counties worked	No. of Projects	No. of Plant-ings	Acres of Pine Protected	Crew	Scouts or Agent	Total	Crew	Scout or Agent	Total	Ribes per Acre	
1	Geo. Washington Nat'l Forest	?	0	212	1569	0	1569	11826	0	11826	7.5	Initial Eradica-tion
1	Watoga State * Park	1	0	100	100	150	250	0	2979	2979	11.9	
1	Watoga State Park	3	0	85	99	0	99	4952	0	4952	50.0	Re-eradi-
1	Geo. Washington Nat'l Forest	?	0	75	435	0	435	1786	0	1786	4.1	cation
2		4+	0	472	2203	150	2353	18564	2979	21543	9.2	E.C.W. Totals

Man-days Labor Used			Man-days Supervision	Costs			Total cost		
Crew	Checker or Scout	Total	Checker other than in Field	Labor	Supervision Checker	Total	per Acre	Ownership	
227	32	259	0	334.17	197.81	531.98	0.339	Federal Government	Initial Eradication
0	11	19	0	96.91	0	96.91	0.388	State Government	
44	0	44	0	61.60	0	61.60	0.622	State Government	Re-eradica-
148	19.25	167.25	0	217.53	118.99	336.52	0.774	Federal Government	tion
427	62.25	489.25	0	710.21	316.80	1027.01	0.436		E.C.W. Totals

* Under Dr. G. Martin's supervision

TABLE 5 LOCAL CONTROL - RESULTS OF RIBES ERADICATION 1934 N.R.A. *

	County in which work performed	No. of Projects	Acres pine protected	ACRES WORKED BY			RIBES PULLED							
							crew		scout or agent		Total		All Ribes Total	Ribes per Acre
				crew	scout	total	wild	cult	wild	cult	wild	cult		
Initial Eradication	Pocahontas	70	2683	570	13169	13739	74786	651	12138	1207	86924	1858	88782	6.5
	Greenbrier	1	38	0	270	270	0	0	743	0	743	0	743	2.8
	Hardy	10	373	0	2727	2727	0	0	1290	18	1290	18	1307	0.5
	Pendleton	33	1511	0	8391	8391	0	0	1556	0	1556	0	1556	0.2
	Raleigh	14	435	101	3655	3756	5794	0	7980	1510	13774	1510	15284	4.1
Reeradication	Pocahontas	6	188	0	1948	1948	0	0	5849	0	5849	0	5849	3.0
Totals		134	5228	671	30160	30831	80580	651	29556	2735	110136	3386	113522	3.7

	MAN-DAYS LABOR			Man-days Supervision State Leader	COSTS							
						Supervision			Supplies & Equipment	Total	Per Acre Worked
	crew	scout or agent	Total		Labor	Scouts	Dist.agents	State Leader			
Initial Eradication	389.4	181.5	570.9	114.0	2169.19	10.35	653.33		72.20		
	0	9.5	9.5	1.0	55.93	0	13.52		0		
	0	37.25	37.25	8.0	140.85	0	398.97		2.41		
	0	78.5	78.5	10.0	485.64	0	583.77		4.00		
	16.7	84.3	101.0	10.0	403.75	0	384.42		12.70		
Re-eradication	0	81.0	81.0	3.5	310.15	0	74.36		0		
Totals	406.1	472.05	878.15	146.5	3565.51	10.35	2108.37	1373.78	91.31	7149.32	0.232

* All land worked under this project was owned by private individuals

TABLE 6 LOCAL CONTROL SUMMARY IN 1934 BY AGENCIES

Agency	No. of Pro-jects	No.of Plant-ing Sites	Acres Pine Pro-tected	Acres worked by			RIBES PULLED							
							Crew		Scout or Agent		Total		Total All Ribes	Ribes per Acre
				crew	scout	Total	wild	Cult	wild	cult	wild	cult		
E.C.W	4+	0	472	2203	150	2353	18564	0	2979	0	21543		21543	9.2
N.R.A	134	0	5228	671	30160	30831	80580	651	29556	2735	110136	3386	113522	3.7
TOTAL	138+	0	5700	2874	30310	33184	99144	651	32535	2735	131679	3386	135065	4.1

Man-days Labor Used			Man-days Super-vision State Leader	COSTS								
					Supervision							
crew	Scout Agent Checker	Total		Labor	Scouts	Dist. Agents	Checker or State Leader	Supplies & Equipment	Total	Per Acre Worked	Agency
427	62.25	480.25	0	710.21	0	0	316.80	0	1027.01	0.436	ECW
406.1	472.05	878.15	146.5	3565.51	10.35	2108.37	1198.78	91.31	6974.32	0.226	NRA
833.1	534.3	1367.4	146.5	4275.72	10.35	2108.37	1515.58	91.31	8001.33	0.241	TOTALS

From table 6 it will be noted that the cost per acre of eradication under the N.R.A.program was only about half the cost under the E.C.W. A number of factors enter into the explanation of this difference. In the first place, the difference in the type of pine land must be considered. Most of the pine acreage under E.C.W. program was distinctly forest land. The pine was surrounded on all sides by wooded areas. The acreage worked under N.R.A. program was in a large measure bordered by agricultural lands, sometimes entirely surrounded by such land. The adjacency of cultivated fields reduces the area which had to be covered for protection of the pine, and consequently reduces cost of protection.

Another factor which may partially explain the difference in cost under the two programs is the somewhat different methods of pre-eradication survey employed. Under N.R.A., the scouting preliminary to eradication was much more thorough. The exact areas to be worked by crew were first ascertained. Under E.C.W. the preliminary scouting was not so intense. Consequently, crews were used to cover a great deal of territory on which the concentration of Ribes did not justify eradication by crew. For example, in the Geo. Washington National Forest 1569 acres were initially eradicated by crew and none by scout, despite the fact that this land averaged only 7.5 bushes per acre. Some of this land apparently should have been worked by scouts only.

Compared to this, under the N.R.A. program, only 671 acres were worked by crew as over against 30160 by scout. However, the concentration of Ribes on the acreage worked by crew averaged 121 per acre as compared with 1 per acre for the land worked by scouts.

Nursery Sanitation

Table 7 summarizes the sanitation work done at the Forest Service Nursery at Parsons W. Va. during 1934. This work was performed with C.C.C. labor from Camp Parsons, located on the nursery ground, as part of the E.C.W. program. Supervision of the work was furnished jointly by the Forest Service and the Bureau of Entomology and Plant Quarantine.

At the end of 1934, the nursery had growing 831,000 white pines. Of these 319,000 were seedlings, and 512,000 were lined out.

This years working was the seventh since 1928 and was performed between May 7 and June 23.

TABLE 7 NURSERY SANITATION

Nursery*	Acres in Nursery Protected	No. of White Pine in Nursery at end of year	Acres Worked			crew		Agent or Checker		Total		Total all Ribes	Ribes not pulled	
			crew	scout	Total	wild	cult	wild	cult	wild	cult		No. of Locations	No. of Bushes
Parsons Federal Nursery	Total acreage of nursery		280	156**	436	2520*	0	711	25	3231	25	3256	3	29

Man-days Labor Used			Man-days supervision other than on Eradication	COSTS			
Crew	Agent or Checker	Total		Labor	Supervision	Total	Per acre
140	41	181	0	196.18	330.97	527.15	$1.209

* Includes 942 bushes pulled on North side of Turkey Knob outside control area for purpose of training crew.

** This figure is merely an approximation

Checking of Eradication Work

In view of the fact that regular control work was begun this year at the opening of the eradication period, and pre-eradication surveys had to be carried along during the summer season, since none of this work had been done in the dormant season, very little time was available to the regular force for minute checking. Most of the checking therefore, was of a general nature. In the latter part of July and early August however, D.H.Fitzwater, regional checker for Maryland, Virginia, and West Virginia, made a detailed check of all the eradication work that had been finished prior to that time. His report was satisfactory. At the opening of the 1935 eradication season, all the eradication work that was not checked last summer will be carefully checked.

Informational Activities

In addition to the eradication work proper, a number of informational activities were carried along. These for the most part consisted in the distribution of pamphlets and the display of posters in public places. An attractive exhibit of material pertaining to blister rust work was arranged for the "Mountain State Forest Festival" at Elkins, West Virginia. This "Festival held annually is the most noteworthy event of its kind in the state and attracts thousands of people interested in forestry from all parts of this as well as many other states. The attendance for the past year ran well over 50,000. All of this material was furnished by the Division of Plant Disease Control.

A number of newspaper articles were released to the press, explaining the nature of the disease and the program undertaken for its control. These activities of a more formal nature were supplemented by informal contacts with the owners of pine stands many of whom were very interested in the work.

Plans for 1935

The pre-eradication survey is to be continued throughout the winter until the opening of the 1935 eradication period. By that time it is expected that from 12-15 thousand acres of pine land will have been located and mapped, ready for the actual eradication. This acreage will be exclusive of any work to be carried out under the ECW program.

At the beginning of the growing season, crews of laborers will be put to work pulling the Ribes from the vicinity of this pine. In the early part of the eradication period in West Virginia labor can be used more efficiently than later in the season. The reason for this is that for a period of from two weeks to a month, in the spring, Ribes are the only shrub in leaf. This fact increases the range of visibility, and, hence, the working range. After all the vegetation is in leaf, the rate at which crews can cover ground is materially decreased. For this reason our plans have been arranged in order to make the most of this favorable period for work. However, it is not expected that all of the pine located in the pre-eradication survey can be covered during this time. The eradication work will continue throughout the summer until about the first of October, at which time pre-eradication work will be resumed.

In addition to this, plans for 1935 include the continuation of eradication work within the Geo.Washington and Monongahela National Forests. This work, however, will be included as a part of the general E.C.W.program. The actual eradication work is to be done with CCC labor. Each CCC camp lying within the white pine area will be expected to furnish labor for the protection of the pine lying within its working circle.

The execution of these plans are dependent on the availability of further funds. At the present time financial provision have been made for the continuance of the program up to June 30, 1935. For beyond that date other funds must be made available. Despite this fact we are looking forward to a greatly expanded program for 1935.

Legislation

The present laws for the control of plant pests are not ideal for the conduction of blister rust control work. Under existing laws the Commissioner of Agriculture is authorized to destroy diseased plants, or those infested with destructive insects. No power is granted to him to destroy healthy plants even though they may be potential vectors of disease. Plans are under consideration, however, for the correction of this deficiency in the state laws, at the next meeting of the legislature.

J. M. Ashcroft,

Marlinton, W. Va.

November 1, 1914

U. S. DEPARTMENT OF AGRICULTURE

MAP SHOWING GENERAL DISTRIBUTION OF WILD RIBES IN WEST VIRGINIA

SYMBOLS

c= Ribes cynosbati
r= " rotundifolium
g= " glandulosum, syn. (prostratum)

= White pine areas

WEST VIRGINIA

SCALE-STATUTE MILES

0 10 20 30 40 50

HAN. BR. OHIO MARSHALL WETZEL MONONGALIA MARION PRESTON TYLER WOOD PLEAS'TS RITCHIE DODDRIDGE HARRISON TAYLOR BARBOUR TUCKER GRANT MINERAL HAMPSHIRE MORGAN BERKELEY JEFFERSON WIRT JACKSON ROANE CALHOUN GILMER LEWIS UPSHUR RANDOLPH PENDLETON MASON BRAXTON WEBSTER CABELL PUTNAM KANAWHA CLAY NICHOLAS POCAHONTAS WAYNE LINCOLN BOONE FAYETTE GREENBRIER MINGO LOGAN RALEIGH WYOMING SUMMERS MONROE McDOWELL MERCER

THE NORRIS-PETTERS CO., WASHINGTON, D. C.

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J.M.Ashcroft
January 11 1935.

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
MONONGAHELA NATIONAL FOREST

S-Disease Control
White Pine Blister Rust

Marlinton, W.Va.
November 9, 1934

RECOMMENDATIONS FOR WHITE PINE BLISTER RUST CONTROL

The necessity for protection of the white pine on the Greenbrier and White Sulphur Districts is apparent since the blister rust has already been found in its summer stage on wild gooseberry bushes in Pocahontas County and in its winter stage on white pine slightly further north in Pendleton County. Delay in the eradication of the Ribes may lead to the disease obtaining a strong foothold in a few years.

The State of West Virginia has been carrying out during the past two years an extensive program of blister rust control of the state parks and on private lands which adjoin the newly acquired national forest lands. This makes it imperative that the Forest Service cooperate at this time and obtain a 100% cleanup of the Ribes, thus preventing its further spread through this section.

WHITE PINE RECONNAISSANCE

Since August, 1934 a complete reconnaissance survey of all white pine stands has been made on all newly acquired national forest lands south of Durbin and east of the Greenbrier River. This area embraces the southernmost portion of the Greenbrier Ranger District and most of the White Sulphur Ranger District.

During this survey 25 stands of varying size have been located and mapped in which the white pine constitutes 5% or over of the number of trees per acre and which are estimated to be of sufficient value to warrant protection from blister rust. Following is a list of these stands:

Area No.	Location	Pine Acreage
1	Head of Rosen Run	75 Approx.*
2	Hevener Tract	50 "
3	Jakes Run	50 "
4	Head of Shock Run	20 "
5	South Head, Shock Run	25 "
6	Sugarcamp Run	10 "
7	Dry Branch, Sugarcamp	10 "
8	Back Creek Road	20 "
9	Rimel Road	25 "
10	Frost	150 "
11	Wylie Tract	15 "
12	Cochran Creek	25 "
13	N.E.B. Tract	30 "
14	Kline Hollow	30 "
15	Douthat Creek	50 "
16	Dry Branch, Deer Creek	10 "
17	Dry Run Hollow	5 "
18	Nave Run	10 "
19	Machine Hollow	12 "
20	McLaughlin Hollow	12 "
21	N.F.K. Anthony Creek	200 "
22	Meadow Creek	300-400 "
23	Spice Run	50 "
24	Sugar Run	25 "
25	Neola Tract	200 "
	Total pine acreage	1509

*Acreage figures are ocular estimates.

ESTIMATE OF WORK, 1935 SEASON

In accordance with the prescribed methods of the U.S. Division of Plant Disease Eradication each of the above mentioned will be worked in the following manner: Two of the best men available, after training in the recognition of the Ribes bushes, will go over each white pine area and scout out the location and number of all Ribes located on the area, and within a surrounding zone 900 feet wide on all sides of the area. This will be done by running strips over the area at intervals of 200-300 feet apart. If relatively few bushes are found, for example 1-50 per acre, the scouts carry out their eradication. If, however, large numbers of Ribes are found over much of the area, it has been found most efficient to employ an eradication crew of 6-8 men and a foreman to remove the bushes.

Scouting

Past work has indicated that two scouts can cover 25-50 acres a day depending somewhat on the topography of the area. For the total acreage of the areas given above, approximately 100 man days of scouting will be necessary for good coverage. Work can probably commence about April 20 when the leaves of the Ribes bushes first appear, and should be completed June 15, unless an unexpected quantity of crew work is found necessary.

Crew Work

Depending on the quantity of the bushes and roughness of the location, a foreman and crew of six men can thoroughly cover an area of 2-6 acres per day. No estimate can here be given of the number of man-days of crew work necessary next spring since no pine areas were found during the reconnaissance on which Ribes bushes were present in sufficient quantities to justify the use of a crew. Later scouting may, however, indicate such areas.

COST OF CONTROL WORK

RESONNAISSANCE BY CHECKER, Aug. 27-Nov. 9, 1934.

Wage cost, 40.5 man-days @ $5.09 per man day - - - -	$206.27
Travel expenses,personal car, 1934 miles @ 5 cents per mile - - - - - - - - - - - - - - - - - -	96.70
Total - - - -	$302.97

ESTIMATE OF SCOUTING, 1935

Following wage cost based on average for C.C.C. labor and subsistence:

Wage cost, labor, 100 man-days @ $280 per man-day ----	$280.00
Wage cost, supervision, 105 man-days @ $5.09 per man day -	534.45
Transportation cost, estimated - - - - - - - - - - - - -	50.00
Total - - - -	$864.45

ESTIMATE OF CREW WORK, 1935

Following is estimate of cost for six-man C.C.C. crew and C.C.C. leader as foreman for average days work of five acres. No estimate can be given at present of total amount of crew work which may be found necessary.

Wage cost, 6 man-days @ $2.80 per man day - - - - -	$16.80
Wage cost, foreman, 1 man day - - - - - - - - - - - -	3.30
Transportation, estimated - - - - - - - - - - - - - -	4.00
Total - - - - - - - -	$24.10

Ward H. Robens

Blister Rust Checker